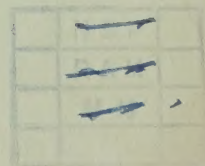




Northern Rhodesia

ANNUAL REPORT
OF THE
MINISTRY OF AFRICAN AGRICULTURE
INCLUDING THE REPORTS OF THE
DEPARTMENTS OF AGRICULTURE
AND
CO-OPERATIVES AND
AFRICAN MARKETING
FOR THE YEAR
1961

Price: 5s. 0d.



MINISTRY OF AFRICAN AGRICULTURE

ANNUAL REPORT FOR THE YEAR 1961

CONTENTS

	<i>Pages</i>
Foreword... ..	iii
Department of Agriculture	1-21
Department of Co-operatives and African Marketing ...	22-29
Map	<i>at end</i>

FOREWORD

The Ministry of African Agriculture, which was formed in 1959, is responsible for the Department of Agriculture and for the Department of Co-operatives and African Marketing. As was done last year the Annual Reports on these two complementary sides of the Ministry's work have been brought together for publication in a single volume, but this year matters have been taken a little further with their integration into a composite Ministry Annual Report. Though the two Departments have retained their separate identities I am glad to be able to record the high degree of co-operation and inter-dependence that has been a feature of the work of the senior staffs of the two Departments who collectively compose the expert and technical cadre at the Ministry Headquarters.

2. In May, 1961, we welcomed the appointment of Mr. M. Halcrow, O.B.E., as Director of Agriculture. He returned to the Department after a period of service as Development Commissioner, Northern Province. By the end of the year, too, we saw the completion of further plans to strengthen the Ministry by the establishment of an Economics and Marketing Branch. To create and guide this Branch we have been fortunate in obtaining the services of Dr. S. M. Makings as Economic Adviser. Dr. Makings is taking up his appointment on January 1st, 1962. The established posts of Agricultural Economist will be included in the Branch, which will be entirely investigatory and advisory in its functions. Its services will be available to other Ministries which have problems similar to our own and one of its main duties will be to examine marketing and production schemes from the economic point of view; an essential of effective development planning.

3. Throughout 1961 much thought has been given by the various Ministries to the preparation of a capital plan for the 1961-65 planning period. My Ministry was particularly involved in these deliberations for on the shoulders of its two constituent Departments will fall a large share of the work of implementing the rural economic development side of the overall Territorial plan. In the agricultural sector of rural economic development particular emphasis will be placed on the encouragement of emerging African cash crop farmers and no effort will be spared in seeking, developing and establishing new crops which promise a worthwhile return to African producers. Much of this work is already in hand and the results achieved during the past year give encouraging hope for the future.

4. Once again, I take this opportunity of expressing my thanks and appreciation to the Directors and their staffs and to the staff at the Ministry Headquarters for their efforts throughout 1961 which made possible the very real progress that is reflected in the two reports that follow. The year 1961 was, it is true, a year in which climatic conditions were generally kind and favourable. But bumper crops would not have been achieved without the strenuous efforts of the extension staffs, not only in supervising the planting and growing but in work connected with the harvesting and marketing of the record maize and groundnut crops. Finally, I must record my thanks to the various boards, committees and other agencies whose tireless work in the interests of African agriculture has made so real a contribution to the growing prosperity in the African farming community.

E. M. L. MWAMBA,
Minister of African Agriculture.

LUSAKA,
March, 1962.

CONTENTS

PART I—AFRICAN AGRICULTURE IN NORTHERN RHODESIA

	<i>Paragraphs</i>
INTRODUCTION	1-3
PRODUCTION:	
Maize	4-9
Other Grains	10-12
Groundnuts... ..	13-15
Burley Tobacco	16
Turkish Tobacco	17
Pulses	18
Cotton	19
Coffee	20
Fruit and Vegetables	21
Cassava	22
Sugar Cane	23
Nindi	24-25
Pachira Nut	26
Livestock	27
Cattle	27-32
Poultry and Small Stock	33-35

PART II—AGRICULTURAL DEVELOPMENT, EDUCATION AND EXTENSION

POLICY	36-38
ORGANISATION	39
STAFF	40-45
LAND CONSOLIDATION AND REGIONAL AND FARM PLANNING	46-49
Southern Province	50-55
Eastern Province	56-57
Central Province	58
Northern Province... ..	59-63
Western Province	64
IRRIGATION	65-67
INSECT, PEST AND DISEASE CONTROL	68-74
USE OF FERTILISERS	75
AGRICULTURAL EDUCATION:	
Agricultural Training Centre, Monze	76-78
Proposed Natural Resources Development College	79
Chibero Agricultural College	80
The University College, Salisbury	81
Overseas Courses	82
In-Service Training	83-84
School Gardens	85
Farm Institutes	86
Farm Walks	87
Agricultural Shows	88
Publicity	89-90
EXTENSION:	
Peasant Farming Scheme	91-93
African Farming Improvement Schemes:	
Central Province	94-97
Southern Province	98-102
African Farming Equipment Company Limited	103
Eastern Province	104-105
Northern and Luapula Provinces	106
Demonstration Farms and Centres	107-113
Farming Committees	114
Animal Husbandry	115-124
Improved Poultry Distribution Scheme	125
Soil Conservation	126-132
Mechanisation, including Ox-drawn Equipment	133-137

PART III—AGRICULTURAL RESEARCH AND SPECIALIST SERVICES

GENERAL	...	...	...	...	...	...	...	138-142
SOIL SCIENCE AND SURVEY	...	...	...	...	...	...	...	143-144
CHEMISTRY	...	...	...	...	...	...	...	145-147
GRASSLAND RESEARCH	...	...	...	...	...	...	...	148-151
PLANT BREEDING	...	...	...	...	...	...	...	152-157
AGRONOMY	...	...	...	...	...	...	...	158-166
ANIMAL HUSBANDRY	...	...	...	...	...	...	...	167-169
PLANT PATHOLOGY	...	...	...	...	...	...	...	170-172
MOUNT MAKULU CENTRAL AGRICULTURAL RESEARCH STATION	...	...	...	...	...	...	...	173-174
MISAMFU REGIONAL EXPERIMENT STATION	...	...	...	...	...	...	...	175-176

PART IV—CO-OPERATIVE SOCIETIES AND AFRICAN MARKETING

INTRODUCTION	...	...	...	...	...	...	...	177-179
GENERAL PROGRESS	...	...	...	...	...	...	...	180-184
RURAL CREDIT SOCIETIES	...	...	...	...	...	...	...	185-189
THRIFT SOCIETIES	...	...	...	...	...	...	...	190-192
CENTRAL FINANCE	...	...	...	...	...	...	...	193-195
CONSUMER SUPPLY SOCIETIES	...	...	...	...	...	...	...	196-198
PRODUCER MARKETING SOCIETIES	...	...	...	...	...	...	...	199-210
CRAFTSMEN'S SOCIETIES	...	...	...	...	...	...	...	211
OTHER SOCIETIES	...	...	...	...	...	...	...	212-213
EDUCATION AND PROPAGANDA...	...	...	...	...	...	...	...	214-218
MISCELLANEOUS:								
Direct Marketing Schemes Run by Department	...	...	...	...	...	...	...	219-225
Audit and Supervision Fund	...	...	...	...	...	...	...	226-227
Audit	...	...	...	...	...	...	...	228-231
Staff	...	...	...	...	...	...	...	232
New Registrations and Dissolutions	...	...	...	...	...	...	...	233-234
Conclusion	...	...	...	...	...	...	...	235-239

APPENDICES

APPENDIX I	Crop Production.
APPENDIX II	Climatic Records.
APPENDIX III	Legislation affecting African Agriculture.
APPENDIX IV	Publications.
APPENDIX V	Peasant Farmers and Improved Farmers.
APPENDIX VI	Volume and Gross Value of African Agricultural produce sold.
APPENDIX VII:	
	Part I: Co-operative Societies as at 31st December, 1961.
	Part II: Co-operative Development, 1957-61.
APPENDIX VIII	Main Crops Marketed Co-operatively during 1961.
APPENDIX IX	Audit and Supervision Fund.
APPENDIX X	Staff as at 31st December, 1961.
MAP	

ANNUAL REPORT OF THE MINISTRY OF AFRICAN AGRICULTURE FOR THE YEAR 1961

PART I—AFRICAN AGRICULTURE IN NORTHERN RHODESIA

INTRODUCTION

The year 1961 was notable for record crops of maize and groundnuts. Sales of African-grown maize to the Grain Marketing Board from the line-of-rail areas, i.e. the Central, Southern and Western Provinces, and from the Eastern Province totalled 935,000 bags (200 lb. net), which was slightly more than the previous highest figure attained in 1957. Groundnut sales which were again confined almost entirely to the Eastern Province, amounted to 150,000 bags (180 lb. net) an increase of more than 30 per cent. over last year's record. While the weather was favourable for most crops, it was definitely not suited to Turkish tobacco which suffered a serious set-back in yield and quality. Burley tobacco on the other hand was not seriously affected.

2. Complete statistics were difficult to obtain for some sectors of the agricultural economy. From the reports submitted and using the best knowledge and experience available, an attempt was made to assess the gross value of African production actually sold through recognised markets in the Territory in 1961. The figure thus obtained was £2,650,371 as compared with the assessment of £2,118,462 for 1960. This gave a fair indication of the progress being made, in the face of approximately a 10 per cent. reduction in the price of maize which was by far the largest item in the assessment.

3. In the subsistence sector, it was an exceptionally favourable season: even in areas where seasonal shortages often occur, surplus crops were recorded.

PRODUCTION

Maize

4. The story of maize production in the African areas of Northern Rhodesia was similar to that for the Federation as a whole. It was an exceptionally favourable season for the growth and production of cereals, particularly maize, and record yields and bumper crops were the order of the day. The Grain Marketing Board's purchases of African-produced maize in Northern Rhodesia during the 1961 calendar year were as follows:

<i>Southern Province</i>	<i>Bags (200 lb.)</i>
From the Africal Rural Marketing Service ...	306,997
From Co-operatives	214,297
Direct deliveries by Registered Producers ...	23,973
	545,267
<i>Central Province:</i>	
From the African Rural Marketing Service...	251,286
Direct deliveries by Registered Producers ...	55,053
	306,339
<i>Western Province:</i>	
From Buying Agents	579
From Co-operatives	2,543
Direct deliveries by Registered Producers ...	499
	3,621
<i>Eastern Province:</i>	
From Co-operatives	69,348
Direct deliveries by Registered Producers ...	7,055
	76,403
<i>Miscellaneous dealings</i>	4,108
Total	935,738 Bags.

This total compares with 718,400 bags in 1960 and with the previous record of 915,000 bags in 1957.

5. In the outlying areas, including the Northern, Luapula and North-Western Provinces and in Barotseland, local sales continued at about the usual level, approximately, 20,000 bags in all.

6. At one stage it was thought that the late rains might increase the proportion of diseased and defective grain. However, in the final analysis 78 per cent. of the crop attained class "A" and 23 per cent. class "B", which was not very different from the averages for 1960. Indeed only 2 per cent. of the 1961 crop went as classes "C" and "D".

7. There was a considerable reduction in price from 36s. per bag of 200 lb. net in 1960 to 31s. 6d. per bag in 1961 for Class "A" with corresponding reductions for the other classes. This was the logical effect of the production within the Federation of a large surplus which had to be exported at a price considerably below the internal subsidised price.

8. In order to cushion the effect of the reduced producer price the Government decided to lower the African Farming Improvement Fund levy on maize sold to Africans in the Southern and Central Provinces from 2s. 6d. to 1s. 6d. per bag. The repercussions of this are referred to later in connection with the Funds' activities. The inevitable trend towards a more realistic price for maize could be a blessing for the African farmers in the line-of-rail areas insofar as they will have to give serious attention to diversifying crop production and getting away from depending solely on the monoculture of maize. This has already happened in the Eastern Province where the co-operative societies fixed their buying prices for maize at 12s. per bag at Petauke and 9s. per bag in Fort Jameson and Lundazi: it was significant that despite the favourable climatic conditions, slightly less maize was sold in 1961 than in the previous year. The Eastern Province farmers now look rather to groundnuts and tobacco for cash.

9. An important feature of maize marketing was the introduction by the Grain Marketing Board of a system of registration of African producers as direct deliverers to Grain Marketing Board depots. In the Southern Province 176 producers were registered and they delivered 23,973 bags. In the Central Province 417 registered producers delivered 55,053 bags direct. There was no doubt that the opportunity to operate exactly as European farmers was readily accepted by a surprisingly large number of Africans. It remains to be seen whether this innovation will continue to attract increasing support from producers now they have had an opportunity to compare their own costs with those of the Co-operatives and of the African Rural Marketing Service.

Other Grains

10. In general it was a good year for sorghum and millets, but there is very little reliable information on the marketing of these products. As food crops some are still subsistence staples in certain parts of the Territory but they are giving way to maize fairly quickly, though they remain in demand for the brewing of beer. It was estimated that organised trade in these grains was of the order of 23,000 bags.

11. Conditions were favourable for rice production in Barotseland. A 12 per cent. increase in the number of growers in the Mongu-Lealui District was reported, bringing the total number to 4,061 families. The paddy fields vary in size up to twelve acres in extent. The total area planted in the Mongu-Lealui District was 1,076 acres and the yield 4,272 bags of paddy rice, i.e. an average of about four bags per acre. There has been a steady increase in production over the past few years. Rice gained ground in other parts of Barotseland too, notably in the Mankoya District. Practically all the crop is consumed locally. In the Eastern Province a small surplus of 1,349 bags (150 lb.) of paddy was purchased and disposed of by the Valley Co-operative Societies.

12. Wheat was grown in a small way by an increasing number of people—about 650—in Barotseland. The total area under the crop was only 75 acres. On the whole the season was not very favourable and the average yield was four bags per acre.

Groundnuts

13. Commercial production was virtually confined to the Eastern Province as hitherto, where an increase of approximately 20 per cent. in cultivation was estimated. The season was generally good though by no means ideal for the crop. Weed competition was very severe in all areas and affected production, while early and late rosette disease caused a reduction in yield in Lundazi. On the other hand many growers profited by accepting the advice of the agricultural extension staff, particularly in regard to seed dressing, early planting and close spacing and, climatic conditions notwithstanding, the upshot was the marketing of a record crop.

14. Appendix I indicates the way in which the industry has expanded recently. The outstanding feature was that three-quarters of the production was exported at premium prices for confectionery purposes. To meet the exacting requirements of this trade the Petauke and Katete Co-operative Marketing Unions graded the crop as hitherto using electrical Polygrada machines. Prices for the confectionery grades ranged from £81 to £94 per long ton c.i.f. London, as compared with local oil expressing and ration trade nuts at £56 per long ton f.o.r. Lusaka. On the basis of these prices and a total out-turn of about 11,077 long tons, the value of the industry was estimated at over £800,000.

15. Commercial production of groundnuts in other Provinces, although insignificant by comparison with the Eastern Province, brought the Territorial total of groundnuts marketed through organised channels to approximately 150,000 bags (180 lb.).

Burley Tobacco

16. Commercial production was confined to the Eastern Province. Under the impact of the very good prices obtained in 1960 there was a considerable swing by cultivators, particularly in the Kalichero and Petauke areas, in favour of Burley at the expense of maize—

a very good thing from a national point of view. The weather was only fair for curing: as a consequence, quality was not quite as good as it might have been and prices were on average 8d. per lb. less than last year.

<i>African Burley Production</i>			<i>Average Price (Limbe)</i>
1960	...	66,080 lb.	32d.
1961	...	249,185 lb.	24d.

The 1,140 producers seemed reasonably satisfied with the returns and there was certainly every indication of sustained interest. The average area per producer was 0.4 acre: the average yield was at the rate of 513 lb. per acre: the average gross return was £51 per acre and the net return, after deduction of marketing and other expenses was £28 per acre. The total value of the crop was £24,866 gross.

Turkish Tobacco

17. The season was the worst possible for the Territory's 1,507 Turkish tobacco growers, which was most unfortunate since most of them had little experience. They grew 500 acres, mainly Samsun. During the critical months of March and April the weather was unusually wet and overcast making curing extremely difficult and reducing leaf quality. Both yield and quality were well below average: it was recorded that approximately 24,000 lb. of the crop was discarded at baling centres or rejected at the sales. Altogether it was a most disappointing year and it was feared that more than half the growers would give up trying to grow Turkish in future. This would have been a pity after all the effort that had gone into encouraging African production and the Government therefore provided over £5,000 to subsidise prices to the extent of that part of the price reduction that it was estimated was attributable to the bad season. This had the desired effect and from recent reports the number of growers and the area has been more than maintained for the 1961-62 season.

African Turkish Tobacco Production, 1960 and 1961

<i>Variety</i>		<i>Year</i>	<i>Production</i>	<i>Average Price</i>
Samsun	...	1960	145,802 lb.	28.6d.
Samsun	...	1961	166,404 lb.	22.7d.
Soluk	...	1960	71,570 lb.	22.8d.
Soluk	...	1961	27,867 lb.	21.6d.

The buyers were unanimous in their favourable comment on the high standard of handling achieved in most areas. This was small comfort for the growers in the face of such a poor season but it did at least go to show that the extension staff of the Department and the growers have gained valuable experience and that the industry has gained strength despite the shortfall in production. Despite the difficulties, the labour involved and the speculative nature of the crop, net returns of the order of £30 to £40 per acre are obviously well within the capacity of the average grower in an average season: by rural standards this cash return is very good. The Samsun leaf was bought by the Falls City Tobacco Company and the Soluk leaf by the Tobacco Development Company of Africa Limited: both firms were most co-operative and understanding.

Pulses

18. Beans, ground beans and cowpeas were produced commercially in only a few areas. Total surplus production was all sold within the Territory and did not exceed 10,000 bags, valued at from £1 to £5 per bag (200 lb.) depending on the kind and quality. Soya beans were not given special encouragement as they are not eaten by the people, and market outlets have yet to be proved.

Cotton

19. There was little spontaneous interest in cotton growing except by a few farmers in the Eastern Province who sold 4,984 lb. of seed cotton and obtained a return of about £15 an acre. In other areas, however, experimental schemes with groups of volunteer farmers under the supervision of the agricultural extension staff were kept going in the hope of paving the way for a revival of this industry. Mumbwa, Monze, Gwembe and Magoye were the main target areas. Peasant growers' own efforts were not very good, giving yields of 150 to 1,000 lb. per acre of seed cotton valued on average at 6d. per lb. on the farm. Demonstration plots, however, did much better—yielding 1,000 to 2,500 lb. seed cotton per acre. The 1961 results were satisfactory enough to justify the inauguration of more extensive pilot schemes at several selected centres with adequate insect pest control facilities.

Coffee

20. Production was still insignificant (about a ton of clean coffee) but the crop continued to gain momentum, particularly in the Northern Province where production was double what it was last year. Of 10,613 lb. of cherry delivered to the pulping station at Isoka, 60 per cent. came from three growers.

Fruit and Vegetables

21. These items were of considerable economic importance in areas near urban centres, particularly the Ndola Rural District adjoining the Copperbelt market. Surveys in this district revealed that African market gardeners cultivated on average about half an acre and made between £40 and £100 per annum. Producers obtained an average of 6d. a lb. for their vegetables including cabbage, cauliflower, lettuce, beans, peas, potatoes, sweet potatoes and turnips. Fruit included bananas, mangoes, citrus, guavas, pawpaws and pineapples. It was estimated that 550 tons of fruit and vegetables valued at over £20,000 in returns to the producers were sold from the Ndola Rural District. An example of the value of a truly rural market was Mongu where vegetables and fruit were sold to the value of £300 per month.

Cassava

22. This was by far the most widely grown crop in the Territory. It is used almost entirely for subsistence or as a standby in case of the failure of other crops. One reason for the popularity of this crop was demonstrated in the results of a garden survey at Chavuma in Balovale District. Two-years-old cassava yielded eight bags of meal per acre as compared with three and a half bags of maize per acre. Three-years-old cassava yielded thirteen and a half bags of meal. Total trade in cassava meal was probably of the order of 20,000 to 30,000 bags but as almost all the trade is in private hands statistics are incomplete or unreliable.

Sugar Cane

23. The main trade was in cane for chewing. It was recorded from the Eastern Province that in the south of the Fort Jameson District 1,500 tons of sugar cane were sold in that way. In addition, three farmers with twelve acres of cane made 12,410 lb. of jaggery. Elsewhere in the Territory chewing cane was a useful sideline for farmers near urban centres.

Nindi (*Aeolanthus nyrianthus* syn. *Gamwelliae*)

24. Exploratory work on this indigenous essential oil plant at Abercorn was carried a stage further, particularly on the technical side. A Research Assistant was assigned whole-time during the flowering season to investigate distillation methods and equipment with a view to standardising the techniques for the production of the required quality of essential oil. Through the co-operation of the Tropical Products Institute in London and a big commercial laboratory, all outstanding questions on the chemical side were successfully answered. The agricultural side, e.g., selection, cultivation, culture, disease control and particularly the economics of production, remain for elucidation. To this end a programme of further investigation was formulated.

25. In the meantime several big firms in Britain and Europe sent enquiries for commercial samples. To sustain their interest while the investigations go forward, a special effort was made jointly by European producers in the Northern Province and the Agricultural Department, and as a result, one and a half hundredweights of the oil was produced for export.

Pachira Nut (*Bombax glabrum*)

26. A special study of this tree species revealed that it has possibilities under the peculiar low fertility/high rainfall conditions that exist in the Northern Province, where arable farming is problematical and at best very expensive. Observations showed that the nuts on a dry matter basis contained 49 per cent. of oil and 14 per cent. protein. They are quite palatable in the raw state with a flavour somewhat like that of Brazil nuts. At a Mission station near Kasama trees are known to be thirty years of age, having been introduced from the Congo. During 1960-61, 8,000 seedlings were raised at the Misamfu Agricultural Station, Kasama, for distribution throughout the Province. The immediate aim is to encourage Pachira nut in the high rainfall areas as a subsistence commodity of high dietary value.

LIVESTOCK

Cattle

27. Statistics collected in 1961 by the Department of Veterinary Services estimated the African-owned cattle population at some 1,070,460 which indicated an increase of 64,787 or approximately 6.4 per cent. on the corresponding figure for 1960. This increase was reflected in the sub-totals for the Southern, Central, Western and North-Western Provinces and Barotseland; the greatest increase, almost 40,000 head, occurred in the Southern Province. The Northern and Eastern Provinces, however, moved against the overall trend showing reductions of 1,500 and 3,000 head respectively.

28. Total slaughterings of cattle by licensed butcheries amounted to 55,000 head, of which it was estimated some 30,000 were marketed by African producers. In addition, an unknown number of cattle were slaughtered in the villages and rural areas for subsistence consumption. The annual take-off from the African-owned herd was, therefore, of the order of 3 per cent. which represented an increase of 1 per cent. over the figure of 2 per cent. quoted in previous reports, but this was probably an underestimation.

29. The main emphasis in the development of the cattle industry was again directed towards the provision of new, and the improvement of existing, marketing facilities including cattle trek routes in the more remote areas. The Cold Storage Commission, a statutory organisation set up under Federal Government legislation to assist the orderly and beneficial development of the cattle industry, which previously had operated only in areas adjacent to the line of rail and in Barotseland, extended the scope of its operations during the year to include the Namwala District of the Southern Province and the Eastern Province. Throughout most of the Territory, private sales between producers and butchers or their agents continued under the long established "permit" system at prices in line with those offered at official sales.

30. Prices, apart from minor adjustments, remained virtually the same as for the previous year and all purchases by the Cold Storage Commission at official sales organised by the Department in the scheduled areas were made on a weight-and-grade basis. In the case of the Southern and Central Provinces, the gazetted liveweight price offered varied seasonally and was subject to a deduction of $1\frac{1}{2}$ per cent. to compensate for the expense incurred in moving cattle to the line of rail. Prices offered in Barotseland, negotiated annually by the Cold Storage Commission and the Barotse Native Government, were increased by 2s. 6d. per 100 lb. liveweight for 1961 following the successful results achieved in the previous season. The Cold Storage Commission operated in the Eastern Province from May onwards and purchased cattle at the gazetted Nyasaland prices, less a flat rate per animal to cover the costs of trekking, holding and transporting the animals to the point of slaughter at Blantyre.

31. Cattle sales in the Abercorn District were organised and run by the Department as part of the comprehensive development plan for the Mambwe area.

32. Four additional sales centres were established during the year, bringing the total number in the areas covered by official sales, to fifty-four. Weighbridges were available at forty-six of these centres. The total number of cattle sold during 1961 at sales sponsored by the Department was as follows:

Province	Grades							Total
	Standard "A"	G.A.Q.	F.A.Q.	Com- pound	Inferior	Graziers	Un- graded	
Central ...	—	7	31	57	8	—	—	103
Southern ...	8	349	900	1,265	547	38	—	3,107
Eastern ...	7	401	576	409	39	317	117	1,866
Barotseland...	3	231	1,033	2,133	—	—	—	3,400
Northern ...	—	—	—	—	—	—	511	511
	18	988	2,540	3,864	594	355	628	8,987

The approximate value of this trade was £134,000 to the producers.

Poultry and Small Stock

33. Poultry continued to be an important item in the cash economy of the African areas particularly in the line-of-rail areas which have easy access to the urban markets where there is an expanding demand for both table birds and eggs. As most of this trade is in the hands of the small producer, reliable statistics are not available. An indication of the volume of trade in table birds alone was given in a report from the Southern Province where it was estimated that 70,000 birds valued at 10s. to 15s. each were sold in urban centres mainly on the Copperbelt.

34. The sheep and goat population was estimated at 164,400 head in all, widely distributed in small flocks throughout the Territory but only a very limited number—about 3,700 head—were sold in regular markets in 1961. They were, of course, consumed mainly in the subsistence economy and provided a valuable source of animal protein in convenient small units for family or village use.

35. The population of African-owned pigs was estimated at a total of 62,900 head, mainly in the Fort Jameson and Petauke areas of the Eastern Province; consumption was largely confined to subsistence. In the Southern Province, however, African producers in the Monze District formed a Pig Producers' Association towards the end of the year and marketed a small initial consignment to the Cold Storage Commission factory in Lusaka.

PART II—AGRICULTURAL DEVELOPMENT, EDUCATION AND EXTENSION POLICY

36. The policy of the Department continued to be based on the development of stable and economic agriculture leading to greater prosperity and a higher standard of living amongst Africans of the Territory, and on the conservation and development of the natural resources of the Territory. The emphasis on economic development was reflected in a concentration of effort in the regions of greatest immediate potential and on the encouragement of cash crop production in selected areas.

37. The attention being devoted to the whole field of natural resources development was underlined by the establishment by the Government of a Rural Economic Development Committee to co-ordinate the expenditure in the rural sector of funds allocated under the Territory's Development Plan for 1961-1965.

38. The various existing boards and committees on which the Ministry of African Agriculture is represented, continued to play their respective roles: these included the Board of African Agriculture, the Natural Resources Board, the Federal Standing Committee on Agricultural Production, the Federal Research Advisory Committee, the Southern African Regional Committee for the Conservation and Utilisation of the Soil, the Agricultural Research Council of the Federation, the Grain Marketing Board, the Tobacco Research Board, the Central African Turkish Tobacco Association, the Chibero Agricultural College Council and the Cold Storage Commission.

ORGANISATION

39. The four Divisions of the Department were unchanged as follows:

- (i) Headquarters Administration in the Ministry at Lusaka, including tobacco and economic advisory staff.
- (ii) The Provincial and District extension staff in the field.
- (iii) The Research and Specialist Services based on Mount Makulu Central Agricultural Research Station near Lusaka.
- (iv) An Agricultural Training Centre at Monze for training African Staff.

STAFF

40. The professional staff numbered fifty-four against an approved establishment of sixty-two. In the technical officer category there were sixty-nine against an establishment of seventy-seven and in the lowest grades including technical assistants, agricultural assistants, capitaos, clerks and orderlies there were 705 against an establishment of 797. Recruitment at all levels barely kept pace with wastage.

41. There were some notable changes in staff. Mr. M. Halcrow, O.B.E. was appointed Director of Agriculture with effect from 19th May, 1961. Mr. I. S. Hutcheson became Deputy Director retrospective to 12th September, 1960. Mr. N. M. W. Irvin, Senior Executive Officer, went on leave in July, pending retirement, after a long and useful career in the Department and latterly as Establishment Officer in the Ministry. J. S. Blacklock was promoted to Chief Agricultural Officer from 19th May; I. H. Muchangwe to Agricultural Officer from 1st January, T. Davies to Agricultural Officer from 7th June. B. Kapota was promoted from Scale C to Technical Assistant.

42. Six new Agricultural Officers assumed duty on first appointment; B. C. Dukes, S. G. Ryle, E. B. Bowles, J. C. Hoyle, J. M. J. Ward, and in January, 1962, A. E. Kashita. The last-named, an African graduate in Engineering of Leeds University, is taking up the new post of Agricultural Officer (Engineering) based at Mount Makulu.

43. A welcome addition to the depleted ranks of the Specialist staff was the return of Dr. A. O. Ballantyne on loan from the Colonial Pool of Soil Scientists. Against this, two plant breeders, B. E. Mounter and J. Smartt, resigned.

44. Nine new Agricultural Supervisors were recruited; M. R. Wake, K. G. Giles, M. H. Whittemore, G. R. Williams, P. J. Bowyer, D. Grewar, P. D. Broster, J. Borrel, H. MacDonald. On the other hand three of the existing staff (Messrs. Hewitt, Turner and Minchinton) obtained transfers on promotion to other Departments; four resigned (Messrs. Mansfield, Tennant, Grewar and Cramond) and four tendered resignations to be effective in 1962 (Messrs. Madge, Reid, Bromley and Hodgson).

45. In addition to the normal establishment, five European staff were employed in a temporary capacity as project supervisors, four of them on tobacco development and one on coffee.

LAND CONSOLIDATION AND REGIONAL AND FARM PLANNING

46. Northern Rhodesia is fortunate as compared with her partners in the Federation and with the East African states, insofar as land problems, though of some importance locally, have not yet assumed serious proportions in the Territory as a whole. Land shortage occurs in a few very limited areas, notably in the Mazabuka District and near Fort Jameson. By and large, however, there is plenty of land available for the population for the foreseeable future. The quality of the land is, however, a different story: in general the soils are relatively poor and for this reason the change from shifting agriculture to permanent farming must be carefully guided in the light of the best available information. To this end regional planning teams have been set up in each of the provinces mainly concerned, i.e. Southern, Central, Western and Eastern, with the object of making development blue-prints for some 600,000 acres during the period 1961-65. Regional planning in the Northern and Luapula Provinces has already been completed to a stage that is adequate for all practical purposes for three or four years to come.

The North-Western Province and Barotseland are not included in this regional planning programme for the present, although a resettlement scheme in the Kafue headwaters area of the former Province was completed satisfactorily; the next stage of this scheme, namely the enforcement of conservation measures and of the residential permit system, was, however, unpopular and met with some opposition.

47. Each regional planning team comprises ideally an Agricultural Officer in charge, a Water Affairs Officer and an Administrative Officer; it is in fact in the nature of a sub-committee of the Provincial Team. In this way the maximum possible co-ordination is attained over the main objectives from Provincial Headquarters to village headmen and the people. There have been instances of reactionary elements managing to influence local public opinion against co-operating with a regional planning team, but this has been the exception and on the whole co-operation from the people has been good.

48. Basic works include major dams, water supplies, soil conservation measures, protection of headwaters and river banks, realignment of roads, resettlement of villages, demarcation and sub-division of communal grazing areas. This kind of comprehensive development calls for the closest co-ordination between the various Ministries at all levels.

49. Progress in the various provinces is summarised briefly as follows:

Southern Province

50. The preliminary comprehensive survey of the Mazabuka District which started late in 1959, was completed during 1961, and the planning team's report is now being studied. Field work for a corresponding report of the Choma District was completed in November; the report on this work will be completed shortly.

51. An Agricultural Officer who was posted to Namwala in August, started on a survey of the agricultural potential of the Namwala District with special reference to cattle and grazing problems.

52. In Mazabuka District six regional plans covering approximately 200,000 acres were in preparation by the end of the year, in respect of the Mwenda and Chikankata areas of Mapangazia, the lower Ngwezi area of Magoye and the Mwanza, Ufwenuka and Keembe Hill areas of Monze. The lower Ngwezi plan has in fact been completed and will be presented to the Natural Resources Board shortly. Construction work in connection with all these plans will begin during the 1962 dry season.

53. Four pilot land usage projects at Mbiya, Tara, upper Kaleya and upper Ngwezi were in different stages of development and on the whole satisfactory progress was made in 1961. The Tara and Mbiya schemes were left to "settle down" during the year and it seems as if these schemes have now been fully accepted by the people concerned. The communal grazing paddocks were in full use and popular with cattle owners.

54. The original upper Kaleya Scheme in Mapangazia made good progress and has more than served its purpose as a pilot demonstration scheme, having paved the way for others in the same area and for the introduction of regional planning on a big scale in the Southern Province.

55. The preliminary phase of the upper Ngwezi regional plan has now been finished with the exception of some dam construction. Work done to date includes:

Contour ridging and storm drains	...	...	160 miles.
Roads	...	...	33 miles.
Paddock fencing (4,665 acres)	...	...	32 miles.
Cultivation boundaries marked	...	...	342 miles
Boreholes established and equipped	...	...	5
Dams and weirs constructed	...	...	6

Eastern Province

56. The Agricultural Planning Officer who was posted to the Eastern Province in July, has been engaged mainly on the production of regional plans of the Nsadsu area and of the south Ngoni area each covering approximately 70,000 acres. The detailed plan for the south Ngoni area, including a pilot scheme covering 3,500 acres, was virtually completed.

57. In the planned areas of Chipangali and Rukuzye, 1961 was a period of consolidation, and no further settlement in these areas was undertaken. Resettlement on a planned basis now stands at twenty-three villages and sixty-one farms. Forty planned farms were still available for occupation.

Central Province

58. The planning team of two Agricultural Officers, an Officer of the Water Affairs Department and a District Officer, started work in October. Since then a preliminary reconnaissance survey of possible resettlement areas for the Tonga people has been conducted and the team was latterly engaged on the production of a regional plan for the Kapyanga area of the Mumbwa District.

Northern Province

59. Work in the five regionally planned development areas in the Northern Province continued satisfactorily. Little new planning was undertaken because existing plans are well ahead of construction.

60. At Mungwi, the classic planned area in the Northern Province, a farm institute has been established and the farms are gradually being taken up by trained farmers. The skeleton layout of the Nankungu Ridge area, an extension to Mungwi, has begun, but farm layout will not be undertaken until the Mungwi farms are fully taken up.

61. In the Mpika District, the Luitikila Basin has been thoroughly surveyed and an irrigation scheme in the Malashi sector was constructed. Irrigated coffee will form the major cash crop in this scheme. The irrigation furrow has reached the farms and coffee seedlings are now being planted.

62. The main Mambwe development scheme in the Abercorn District which originally met with considerable opposition, was left for the time being; the people were without a Chief and consequently engrossed in political matters. A pilot sector of the Mambwe resettlement area was, however, planned and roads, dambo demarcation lines and fencing were put in with the full co-operation of the people.

63. The Mushota planned area in the Kawambwa District made steady progress with the full co-operation of the Native Authority and people. The problems of suitable cash crops and of marketing are particularly difficult here.

Western Province

64. Detailed survey and investigation of the Kafulafuta Valley in the Ndola Rural District was started recently under an experienced Agricultural Officer specially detailed for this work, which is virtually a research project on the possibility of utilising the seepage areas.

IRRIGATION

65. The water resources of Chief Chikwanda's area of the Luitikila Basin near Mpika in the Northern Province were thoroughly investigated on contract by Messrs. Kanthack and Partners, who submitted a comprehensive report including recommendations on irrigation and hydro-electric power possibilities. The survey had been commissioned by the Development Commissioner, Kasama. In pursuance of the recommendations, a small irrigation scheme was started at Malashi. It involves conveying the entire output of a powerful spring—minimum 1.85 cusecs—across a gully by means of a ten-inch diameter inverted siphon and thence by lined furrow to command an area of 560 acres. This area has been planned in twenty to thirty-acre units for intensive farming and was being quickly taken up.

66. In the Gwembe District of the Southern Province two major irrigation possibilities in the Zambezi Valley have been investigated by consultants. Preliminary reports have been received and as a result, further investigations have been initiated, especially in the Buleya area.

67. The Kafue Pilot Polder scheme has continued efficiently but under the threat of financial difficulties. These are being actively investigated by the Trustees. On the irrigation side there are fundamental problems of the soil that look like constituting a major barrier to progress: a soil physicist has been appointed to strengthen the team in this connection.

INSECT PEST AND DISEASE CONTROL

68. As a result of consignments of Eastern Province groundnuts for the confectionery trade arriving in England severely infested with *Ephesia cautella*, Mr. D. L. Proctor, an entomologist from the United Kingdom Pool of Stored Products Workers was appointed in March to investigate all aspects of infestation problems of groundnuts. The work has involved negotiations with the Nyasaland and Mozambique authorities, and good progress has been made.

69. The control of cotton pests was again effectively demonstrated at twenty-one centres. Spraying with insecticides eight to ten times, as required, more than doubled the yield: the average yield of seed cotton from sprayed plots was 1,104 lb. per acre as compared with 480 lb. per acre from unsprayed control plots. This confirmed the results of similar trials in previous years. In general, a yield of over 1,000 lb. per acre is an economic proposition. The way is now clear for an expansion of cotton growing: this is an important break-through in the struggle to diversify crop production and get away from a monoculture of maize. Some refinements in spraying technique are still necessary and are receiving attention.

70. Bean stem maggot (*Melanogromyza phaseoli*) was a serious pest of dwarf beans throughout the Territory: it was also recorded on lima beans and soya beans. Satisfactory results were obtained by seed treatment with "Dieldrin" or "Endrin".

71. Corn root worm was responsible for some damage to young maize. This pest is on the increase and control is not easy.

72. A rice stem borer, so far not identified, was recorded as infesting 80 per cent. of paddy at the Kafue Pilot Polder.

73. The only major disease problem with tobacco was "wildfire" that caused damage in seedbeds as well as in the field. Bushy top virus was also in evidence and represents a threat to the Turkish tobacco industry.

74. A new disease of groundnuts, "stunt", was recorded and described, and a new pest—a coccid—was recorded as damaging lawn grass in Lusaka.

USE OF FERTILISERS

75. Fertilisers were used by African farmers to an increasing extent—maize, Turkish tobacco and Burley tobacco being the main crops concerned. Exact figures are not available because many farmers bought direct or through co-operatives. The Department distributed through various repayment schemes, approximately 1,200 tons of fertilisers in the proportions 800 tons sulphate of ammonia and 400 tons superphosphate. In addition, approximately twenty-five tons of tobacco fertiliser were distributed. Distribution channels were still by no means satisfactory: this is a problem that continues to demand attention.

AGRICULTURAL EDUCATION

Agricultural Training Centre, Monze

76. The Department's Agricultural Training Centre at Monze was brought directly under Headquarters administration as from 1st July, 1961. The centre was fully extended to cope with the training of African Agricultural Assistants. Proposed improvements and extension are indeed urgently necessary. Thirty-four students successfully completed the two-year course and were accepted for service in the Department. Fifteen students of the same course failed but four obtained employment with the Government in other capacities. This was the tenth course since the centre began in 1950.

77. Forty-one students started the 11th course in 1960 of whom thirty-one completed the first year successfully in June, 1961, and were allowed to continue into the second year. Forty students completed the "pick and shovel" pre-training period and started the twelfth course in September, 1961.

78. On the question of financial aid from the United States, A.I.D.—formerly I.C.A.—negotiations continued throughout the year and it was finally agreed that further consideration should await the recommendations of an American expert, Dr. Luther Brannon, due to arrive in January, 1962, for two or three months' investigation on the spot.

Proposed Natural Resources Development College

79. In the meantime, under the Rural Economic Development Plan, an idea has been mooted for a Natural Resources Development College that might cater for the needs of most of the departments concerned with rural development. Whereas the Monze Agricultural Training Centre takes students with basic education as low as Standard VI (though Standard VIII is now the aim), the proposed Natural Resources Development College would aim for school certificate people with a view to awarding diplomas.

Chibero Agricultural College

80. The Chibero Agricultural College near Salisbury was officially opened by His Excellency the Governor-General in October, 1961, the Northern Rhodesia Government being represented by the Minister of African Agriculture. Six places on the first course were available for Northern Rhodesia, but despite strenuous efforts on the part of the Ministry to encourage applicants to come forward, there was only one Northern Rhodesian in the first intake; several suitable candidates were found to be lacking in the academic qualifications required for entry. The prospects look much brighter for the second intake due to start in October, 1962: already eight applications have been received. Chibero offers a three-year course leading to the award of a diploma in agriculture.

The University College, Salisbury

81. At the present time there are no Northern Rhodesians reading for degrees in Agriculture at the University College in Salisbury.

Overseas Courses

82. The Headmaster of the Monze Agricultural Training Centre, Mr. Chaka Ng'ambi, completed a year of training at the Surrey Farm Institute in Britain on a Nuffield bursary. Mr. Peter Greening, Agricultural Officer and Mr. Peter Jones, Agricultural Supervisor, went on I.C.A. courses in the United States of America. Mr. Paul Mwansa, Technical Assistant, is now training at the Surrey Farm Institute. Five Northern Rhodesia Africans went to Britain on a six-week farm study tour, organised by the British Council and paid for by a well-wisher in the Federation. They were all most impressed and the indications are that this type of course is worth continuing.

In-service training

83. This has become an important aspect of the work of the Department. Numerous short courses were held at various centres for members of the extension staff at all levels. These courses were designed to improve the quality of the work in specialised fields, e.g. soil conservation, mechanisation, Turkish tobacco and cotton. In general the necessity for in-service training is fully appreciated and every effort is now being made to plan refresher courses for all the staff at regular intervals.

84. Agricultural Officers, Supervisors and Assistants assisted with numerous courses organised by Community Development Officers at Development Area Training Centres throughout the Territory. It is recorded for example that two courses were held every month at Namushakende, Barotseland in which the Department assisted, and that staff of the Monze Agricultural Training Centre were very heavily committed with about half the many courses held at the neighbouring Development Area Training Centre. The value of the effort and the potential impact may be gauged from some attendance figures from these centres. The total number of men and women on courses in 1961 was 2,378 of whom 356 were on purely agricultural courses, the balance being primarily on other subjects with a little agriculture included.

School Gardens

85. Agricultural staff at all levels continued to assist the education authorities with school farms and gardens. The extent of this activity is illustrated in the case of the Northern and Luapula Provinces where 300 upper schools and 400 middle and lower schools were supervised in regard to their farms and gardens.

Farm Institutes

86. The move towards the establishment of farmers' training centres—they are being called Farm Institutes—has made satisfactory progress. In addition to the first one already started at Mungwi, near Kasama in the Northern Province, plans for two more are now firmly under way at Kanchomba in the Southern Province and Katapola in the Eastern Province. Initially, each centre will have residential accommodation for up to thirty farmers and/or wives, plus the necessary training facilities. Provision for further centres is being sought to enable this institutional framework to be extended to meet requirements throughout the Territory. This is a very significant development and virtually initiates a new phase in the Department's extension work.

Farm Walks

87. Farm walks and farmers' days were held at most of the Department's stations and demonstration centres and at selected farms throughout the Territory. These were very popular with the people and with the staff and there is no doubt that they were a useful adjunct to the extension services.

Agricultural Shows

88. Exhibits were staged at nineteen agricultural shows in various provinces of the Territory. This represents a great deal of work and effort involving staff at all levels, but the potential impact is well worth it. In the Eastern Province, for example, it is estimated that 12,000 people attended the Katete show, 4,000 attended the Lundazi show and 3,000 attended the first Kagoro show: the last-mentioned was organised entirely by the Native Authority and opened by Paramount Chief Undi of the Chewa.

Publicity

89. Much effort was made by staff at all levels to meet the insatiable demand for material for news items, propaganda and publicity by various agencies, i.e. the Northern Rhodesia Information Department, the Federal Broadcasting Corporation and the national newspapers.

90. The Department's Visual Aids Unit at Mount Makulu was kept busy throughout the year making display posters, other visual aids and a variety of requirements for the extension services. The Unit produced 25,000 posters on various subjects and 4,000 certificates in response to requests from various branches of the Department. The usefulness of visual aids depends almost entirely on the experience and dexterity of the operators and up to the present very few, if any, of the field staff could be said to be able to make full use of this Unit. A working party comprising the Commissioner for Rural Development (Chairman), the Chief Information Officer and the Director of Agriculture, was set up in November to supervise and review the results of investigations and operations of a UNESCO expert adviser in this field.

EXTENSION

Peasant Farming Scheme

91. This is a long-established loan scheme to assist cultivators in changing from shifting cultivation to settlement in planned farming units of fifteen to forty acres of arable land. The loans, which have been free of interest up to the present, are repayable over ten years,

and cover stumping, permanent improvements, oxen and implements. The financial basis of this scheme is a revolving fund, set up jointly by the United Kingdom Government through Colonial Development and Welfare Funds and the Northern Rhodesia Government. The fund now stands at £300,000 most of which has been taken up, particularly in the Eastern Province. The number of registered peasant farmers has shown a steady increase over the years; the total in 1961 was 2,565 as compared with 2,423 in 1960.

92. There is no doubt that this scheme has been a major factor in speeding up the rate of progress of African farming in Northern Rhodesia, notably in the Eastern Province: it has continued without any major change since 1948 but has begun to show weaknesses. For example, despite strenuous efforts by the extension staff, repayments have fallen seriously behind. Falling prices, particularly for maize and Turkish tobacco inevitably affect the ability of borrowers to repay. The acreages cultivated by individual farmers in many cases appear to be too small, and they give a return which is insufficient to enable these farmers to repay the capital invested in their farms. Maintenance of fertility is a problem. It has indeed been suggested that the success of the scheme is very much in the balance. In the meantime a thorough investigation is being carried out by the Department's economist and every effort is being made to improve advisory services.

93. Originally the various Peasant Farming developments were based on the exploitation of particular areas of land, which were surveyed and divided into a number of individual units. The scheme is not, however, restricted to those who take up holdings in groups, and Africans who cultivate suitable holdings in other parts are eligible for benefits under the scheme, provided that the cultivator is prepared to follow certain sound agricultural procedures. But the scheme does not apply to all Africans who are living independently outside a village community and farming in a limited way. Experience has, in fact, shown in the remoter areas that although this class of person often produces surpluses over his subsistence requirements, he is frequently reluctant to accept advice and to follow up-to-date farming methods. For instance, in the North-Western Province, the "corridor" experimental settlements, which were an attempt to rationalise shifting cultivation have, with one possible exception in the Balovale District, shown little prospect of ultimate success.

AFRICAN FARMING IMPROVEMENT SCHEMES

The Central Province African Farming Improvement Fund

94. The season 1960-61, was the tenth season that the fund had been in operation. The number of farmers registered under the Improved Farmers Scheme was 1,072—an increase of 133 over the previous year—and the area of farms was 20,779 acres, i.e. the average size was nearly 20 acres. The bonus scheme was on the usual basis, i.e. first class 20s. per acre, second class 15s. per acre. A total of 485 farmers were successful at first-class level, 266 at second-class and 321 failed. The total sum paid out in bonuses amounted to £15,617 8s. 0d.

95. The loan scheme was popular; applications for loans for implements in the heavier range were particularly noteworthy. A total of £10,474 of new loans were approved during 1961 and £10,653 of outstanding loans was repaid leaving a balance of £9,899 still outstanding from previous years. Some difficulty was experienced in recovering repayments due: this weakness of the scheme is receiving attention. Loans under this scheme carry interest charges of 4 per cent.

96. Despite the exceptionally good maize sales during the year, the annual income fell to approximately £36,000 due to the Government's decision to reduce the maize levy (which is the Fund's principal source of income) from 2s. 6d. in 1960 to 1s. 6d. in 1961. The Board, of which the Provincial Commissioner is chairman and the Chief Agricultural Officer is the executive officer, and which includes African representatives, has wisely set about tightening up expenditure against the possibility of a further reduction in the income of the Fund.

97. To sum up, the overall position of the Central Province African Farming Improvement Fund was satisfactory but there is cause for careful consideration as to the future. The Fund's investments stood at £245,000 at 31st December, 1961.

The Southern Province African Farming Improvement Fund

98. This Fund has been the main agricultural extension instrument in the Southern Province since the inception of the Improved African Farmers' Scheme in 1947. During 1961 its operations were on a wide front. This is illustrated by the following list of the main items of expenditure:

Improved Farmers' Bonus	...	...	...	£34,764
Water Development	...	...	...	1,200
Soil and Water Conservation	...	...	...	28,578
Regional Planning	...	...	...	7,320
Capital Equipment	...	...	...	932
Scotch Cart Subsidy	...	...	...	6,500
Fertiliser Subsidy	...	...	...	3,000
Farm Improvement Subsidy	...	...	...	3,000
				£85,294

99. The number of farmers registered under the Improved Farmers' Scheme was 2,173 which was about the same as last year. A total of 203 failed to make the grade: 1,571 qualified for a Grade A bonus, 399 for Grade B. The total area involved was 39,030 acres or an average of 19.8 acres per farm.

100. In addition to the expenditure shown above, the fund continued to operate a loan scheme. During the year, 409 loans were approved for periods of one to three years to a total value of £7,651. The interest rate was 4 per cent. with a 10 per cent. penalty rate. Repayments were excellent at £7,846 so that the amount set aside for the loan scheme is being turned over annually—a remarkable achievement, especially taking into consideration the nature of the items involved, e.g.:

141 Scotch Carts	...	...	...	...	£3,330
109 Cultivators and Harrows	...	...	...	...	766
43 Ploughs and Ridgers	...	...	...	...	388
267 Rolls of Barbed Wire	...	...	...	...	898
8 Rolls of Chicken Wire	...	...	...	...	20
23 Planters and Shellers	...	...	...	...	601
4 Trailers	...	...	...	...	490
3 Tractors	...	...	...	...	900
2 Tractor Ploughs	...	...	...	...	125
2 Maize Graders	...	...	...	...	12
2 Fencing Gates	...	...	...	...	12
10 Shares and Small equipment	...	...	...	...	109
					£7,651

101. In connection with the scotch cart subsidy, it is recorded that in the Southern Province, 125 steel-wheeled carts and 375 rubber-tyred carts were purchased by farmers during the year.

102. The Southern Province Fund is also faced with a financial problem due to the reduction in the levy from 2s. 6d. to 1s. 6d. per bag of maize. Despite a near-record crop, the income, estimated at £30,000, did not even meet half the approved budget expenditure. The Board has set about the task of cutting its suit according to its cloth.

The African Farming Equipment Company Limited

103. The African Farming Improvement Funds of the Central and Southern Provinces, together with the Northern Rhodesia Industrial Development Corporation Limited, are the joint proprietors of this company, each having subscribed £7,500 in share capital. The two Funds have in addition made substantial loans to the company which was formed with the primary object of supplying African farmers in areas not adequately served by other commercial undertakings with farm machinery, equipment and other requisites. The company has served a most valuable purpose in meeting the needs of African farmers. It had a very successful year, with a turnover of £101,700 as compared with £47,000 the previous year, and made a net profit of £4,892. A total of 75 per cent. of the company's business was done in the Central Province.

The Eastern Province African Farming Improvement Fund

104. This is a small fund. During 1961 its income came largely from the levy of 2s. per bag on groundnuts. In addition, a small sum was obtained from the interest on the £30,000 price stabilisation fund for which the Board is the trustee. Expenditure was incurred on projects such as:

Good Farming Bonus payments,
Village Improvement scheme,
Soil and water conservation works,
Groundnut seed to rosette-stricken areas,
Seasonal loans for tobacco growers.

105. Regarding the Village Improvement Scheme it is recorded that the old idea of tackling the improvement of the gardens of all members living in a village was gradually being replaced by an approach to individuals, which was more successful. Experience has shown that the village as a unit is no longer cohesive enough and lacks the internal driving force necessary to achieve overall improvement. The trend of extension policy is towards sustaining the progressive individuals in a village by means of what is best described as a smallholders' scheme operated on the lines of the Peasant Farming Scheme scaled down to fit the circumstances.

Northern and Luapula Provinces

106. In the case of these two Provinces the finance for inducements and subsidies for improved farming was not derived from levies but was provided under the Special Intensive Rural Development Scheme applied to this particular region from 1957 to 1961. The main item of expenditure in this particular case was a Good Husbandry Bonus Scheme in which 127 farmers qualified in 1959-60, and probably as many in 1961 but the returns were incomplete to date. Other items were subsidies for fertiliser, water supplies and fencing: here again the

records were incomplete to date owing to re-organisation necessitated by the winding up of the Northern and Luapula Provinces Development Plan and the transfer of continuing projects to the control of the appropriate ministries.

Demonstration Farms and Centres

107. The Department's extension services were based on forty-eight centres excluding the seven provincial headquarters offices. In addition there were many minor centres and native authority farms that continued to provide facilities including nurseries, seed multiplication plots, land usage trials and improved farming demonstrations. In the Gwembe Valley for example, twenty-six pilot plots were used for demonstration purposes.

108. In the Southern Province it is recorded that 1,392 people attended fifty-eight field days on agricultural stations and 3,499 people attended fifty-one field days on selected farms in the Native Reserves. These farm days were said to be extremely popular and much more effective than visits to stations. Wives were also beginning to take an interest in the social side. A feature in the Monze District extension work was 108 village meetings with an average attendance of twenty people at each meeting. Exchange visits between European and African farmers were a feature in the Kalomo District and proved very successful.

109. At Mankoya in Barotseland, the Land Use Mixed Farm in its sixth season continued to demonstrate sound land use, diversification of crop production and animal husbandry on a typical size of plot. A total of £75 worth of crops at local value were produced from just under three acres during the year.

110. In the Northern Province a steady expansion of the Department's activities was recorded, despite political disturbances. A trial in village rehabilitation was undertaken at Kabula in the Mungwi Intensive Development Area near Kasama. A good start was made and if the initial success can be maintained, this venture could well be an important milestone in agricultural development in Northern Rhodesia. In the Mambwe Reserve the system of farming demonstrated in recent years at the Mwamba demonstration farm has been well tested and proven and has stimulated a great deal of interest among the people in the Reserve.

111. In the Luapula Province the publication during the year of the report on the Health and Nutrition Scheme was the culmination of many years of joint effort between the administration, health and agricultural authorities based on Fort Rosebery and the World Health Organisation. The Report has underlined the urgent need for agricultural development before the inevitable cycle of "poor soils and poor people" becomes more pronounced.

112. It has become routine in the Petauke District of the Eastern Province to conduct a village-by-village survey. The result in 1961 revealed that the area devoted to groundnuts had increased considerably in relation to maize, especially in the Luangwa valley. Moreover, the actual area of the family unit of cultivation has increased appreciably due to the increased cultivation of groundnuts.

113. The opinion has been expressed that as far as the Eastern Province was concerned, too much attention was paid by extension staff to village cultivators growing only a few pounds weight of tobacco, resulting in insufficient attention to the Peasant Farmers. A similar criticism came from an African farmer in the Southern Province who expressed the view that many African farmers have reached the stage when they want and need specialist advice. The answer to such criticism lies in raising the standard of the extension staff in keeping with the rising standards of the emerging African farming community: the matter is receiving careful attention.

Farming Committees

114. There are now twenty-nine Committees in the Southern Province. These Committees have evolved from the former Livestock Improvement Committees which were started by the Veterinary Department, and in its present form the system dates from 1959 when Animal Husbandry was transferred to the Agricultural Department. Its success now seems assured and the Committees play an important part in the execution of certain aspects of the Improved Farmers' Scheme. But they are fully representative of the farming community and the local authorities, and have played an increasingly important role as agricultural "sounding boards".

Animal Husbandry

115. The general standard of animal husbandry remained very poor throughout the Territory but there were heartening signs that the advisory work of the Department was not altogether without results.

116. In the Southern Province a "new look" to the Livestock Improvement Scheme resulted in greatly increased interest. Extension staff held special meetings, particularly in the Choma and Kalomo Districts on the subject "Cattle as a Business". A total of 254 stock-owners, with an aggregate of 13,083 cattle, participated in the scheme and earned £2,204 in bonus payments on sales of grades F.A.Q. and above. The emphasis on animal husbandry in this province was logical, since there are nearly half a million African-owned cattle or over 40 per cent. of the national herd. The "take-off" including known sales, estimated sales and estimated local subsistence consumption was calculated at less than 5 per cent.—a

very unsatisfactory and uneconomic proportion by commercial ranch standards. Twenty-one improved bulls from the Kalomo Station and eighteen from the Kanchomba Station were sold to cattle owners.

117. In the Central Province the development programme continued on the Department's Irumi Ranch at Mkushi in association with the Chililabombwe Agricultural Station to provide cattle for sale and distribution to farmers in the Serenje and Mkushi Districts. Cattle were brought from the Southern Province to help stock new peasant farms in the Ndola Rural District.

118. Because staff in the Eastern Province were fully committed with other work on the crop side, the Department was unable to give as much attention to animal husbandry as it wished, but the advent of the Cold Storage Commission with a resident buyer in the Province was another step towards getting livestock appreciated as a major factor in the economy of farming. A new market was opened at Kanyebele in the Ngoni area. This brought the total number of markets with weighbridges to eight in the Province. A pilot hide-drying improvement scheme was started at Kagoro near Katete towards the end of the year.

119. In the Northern Province despite difficulties in the Mambwe Reserve of the Abercorn District, cattle sales by weight and grade were successfully introduced. This reflected considerable credit on the extension staff for their careful and patient work over several years; in June, 1960, the Department had taken over from the District Commissioner, Abercorn, responsibility for a cattle revolving fund which was originally set up to assist in supplying peasant farmers with cattle from the over-stocked Mambwe Reserve. A total of 212 cattle were offered by the cattle owners at four sales and 151 bought by the Department at prices varying from an average of £6 14s. 4d. for Inferior Grade to £14 5s. 0d. for G.A.Q. The scheme was well received by the people.

120. The Mbesuma Ranch in the Chinsali District of the Northern Province had a successful year. Owing to the low level of the Chambesi river, cattle remained on the flats for most of the year and consequently held excellent condition. Weaners weighed on average 525 lb. at the sales, which was exceptionally good. Following a serious outbreak of redwater in cattle on the west flats, a spray race was erected near Ndasa Hill. Sales for the year 1960-61 were as follows:

<i>Slaughter Stock</i>	<i>Sold to Africans</i>	<i>Sold to Europeans (including Butchers)</i>
Cull cows and queans	20	240
Steers	9	54
Bulls	1	1
Oxen	—	3
	30	298
	—	—
<i>Breeding, Feeding and Cattle in General</i>	<i>Sold to Africans</i>	<i>Sold to Europeans</i>
Cows	5	—
Bulls	3	—
Heifers	48	19
Steers	79	—
Weaner females ...	181	—
Weaner males ...	3	110
	319	129
	—	—

The revenue from these sales amounted to £7,627. The total number of deaths during the year was 111, including twenty-seven from redwater and heartwater, twenty-six by wild animals and seven from snakebite.

121. The position at Mbesuma regarding infestation with *Lantana camara* is unchanged in as far as it remains a serious problem, but good progress was made in the attempt to reclaim the land: 300 acres have now been cleared and planted with maize preparatory to sowing down to Rhodes Grass. A further 300 acres were made available for temporary village gardens with a view to stumping and ploughing in due course. The cost of reclamation worked out at approximately £15 per acre, which was offset to some extent by sales of the maize grown on the cleared lands.

122. The Department continued to manage the Chishinga Native Authority Ranch in the Kawambwa District of the Luapula Province. This was started by the Development Commissioner with the object of introducing cattle into an apparently suitable but empty area of Chief Mushota's country; it is run on commercial lines in the hope of providing the Native Authority with some revenue while at the same time giving the Province a good source of cattle for distribution and consumption. A pasture survey revealed that the area set aside for the ranch up to the present was insufficient to carry a herd large enough to make the project economic. The total herd was 507 in August, 1961. Alternative suggestions for effecting improvement have been submitted for consideration by the Native Authority.

123. It has been established by bitter experience that the high rainfall areas of the North-Western Province are generally unsuitable for cattle owing to major deficiencies in the quality of the herbage, the enormous parasite burden and trypanosomiasis. Breeding stock are under a particular stress in these circumstances. Mortality was very high amongst the small experimental herds. Animal husbandry was, therefore, concentrated in the Balovale area, where a Livestock Officer was stationed throughout the year. A small livestock improvement and loan scheme was operated in this area and has continued to date with considerable success. Indeed, it has been suggested that cattle should be imported to speed up the development of the livestock industry of the area: this is under consideration but would probably be too expensive.

124. The possibility of an improvement in animal husbandry was greatly increased through the success that has attended the Cold Storage Commission's operations on the marketing side in Barotseland. So far the Department's efforts were confined to erecting eight sale yards at selected places and arranging facilities, including twenty-five kraals, on the cattle route out of the Protectorate to a holding camp near Livingstone.

Improved Poultry Distribution Scheme

125. Young breeding stock—Rhode Island Red and Black Australorp—were distributed to Agricultural Department holding stations from the Veterinary Department's hatchery at Mazabuka. Reports from the various provinces pointed to the need for a close review of the scheme. In the Southern Province, 1,934 birds were distributed. In the Central and Western Provinces the demand continued to be greater than the supply: a similar position occurred in the Eastern Province. In the other provinces the results gave cause for concern. In the Northern and Luapula Provinces mortality was high but not recorded. In the North-Western Province the survival rate was 68 per cent. of 330 birds distributed in the Balovale-Kabompo region and only 31 per cent. of 277 distributed in Solwezi. In Barotseland a follow-up revealed a survival rate of only 50 per cent.

Soil Conservation

126. In the Southern Province, 27,360 acres were protected by conservation works constructed under regional plans, including 8.4 miles of storm drains, 502 miles of graded contour banks, 228 miles of level contour banks, 24 miles of demarcated drainage lines and 156 miles of realigned roads. The average cost of all these works varied in the different areas from 17s. to £3 12s. 0d. per acre and the average overall was £1 15s. 0d. per acre. Thirteen small weirs and dams were constructed at a cost of £250 each. A total of 11,165 acres of grazing land were enclosed in paddock fencing at a cost of 16s. 6d. per acre. Over £37,000 from the African Farming Improvement Fund was spent in this way.

127. It is very significant that the Plateau Tonga Native Authority in the Mazabuka District revised its Garden Orders so as to pass the responsibility for the construction of normal contour works on to the people themselves. The effect of this in the upper Ngwezi area was that the main key contours were put in at the expense of the Fund while the intermediate contour banks were constructed by the people, i.e. the landholders concerned.

128. In the Central Province, 194 miles of contour banks were constructed, mainly in connection with Improved Farming and Peasant Farming schemes.

129. There was an interesting example of voluntary effort by the Lusaka Youth Club under the Senior Welfare Officer, in checking erosion of stream banks in the Chipapa area south of Lusaka. The first two African Intensive Conservation Committees of the Natural Resources Board were formed, early in 1961, at Keembe and Mungule in the Broken Hill Rural District.

130. In the Eastern Province, 1,300 miles of contour pegging was carried out by extension staff to protect some 11,700 acres of gardens used mainly for groundnuts. The actual construction was done by the people concerned. A few miles of storm drains were dug to protect land near the bases of hills. All Native Authorities have taken a very keen interest in soil conservation and have never hesitated to use their Rules and Orders if required. It is worthy of note that the ridge cultivation of crops is now taken for granted in most areas but the protection of grazing areas and seepage channels still leaves much to be desired in the Ngoni country.

131. In contrast to the generally enlightened attitude reflected in the previous paragraphs, the position in the Northern and Luapula Provinces was somewhat frustrating and depressing. Neither the Native Authorities nor the people in general showed much awareness or interest in attempts by the staff to stop late burning, the destruction of watershed vegetation and stream bank cultivation. In the Chitemene Control Areas of the Abercorn, Isoka and Mporokoso Districts, the programme went on smoothly as it has more or less for the past twenty years, but there were indications in the Abercorn District that the re-growth cycle was getting dangerously short.

132. A similar state of affairs existed in the North-Western Province where stream bank and seepage area cultivation increased despite the efforts of the Natural Resources Subcommittee of the Provincial Team. By African standards, however, erosion is not really a problem in this region.

Mechanisation, Including Ox-drawn Equipment

133. It is not surprising in this mechanical age that emerging Africans should look to machines as the "open sesame" to status and prosperity. In 1961 Northern Rhodesia saw a steady increase in the number of African-owned tractors, most of them bought with little or no thought for economics! Nevertheless, it was recorded that in the Southern Province where there were 108 African-owned tractors—mostly Ferguson—40 per cent. were in good condition and probably earned their keep. About half the owners undertook contract ploughing and transport. An example of the impact that mechanisation is making in the African areas came from Mapangazia—a small part of the Mazabuka District—where twenty-one hammer mills were reported in profitable use and forty privately-owned vehicles including cars and landrovers were assisting in diversifying the economy by way of trade in minor commodities, vegetables, small stock and poultry.

134. The number of tractors in the Central Province increased from 159 in 1960 to 238 in 1961. Whereas the oil companies were pushing out supply facilities, the same could not be said of the tractor dealers whose after-sales service in the African areas are generally inadequate. It is partly because of the low standard of maintenance that the hire-purchase companies consider African tractor owners very poor risks indeed.

135. An experimental mechanisation scheme in the Vizimumba area of the Eastern Province was closed down because the farmers failed to honour promises to pay hire charges. This was a small scheme comprising a one-tractor unit complete with implements, financed from the Eastern Province African Farming Improvement Fund and devised to bring new life to a remote African farming area, where productivity was limited by the heavy nature of the soil and the presence of tsetse fly. The inclusive charge for ploughing, discing and ridging was 52s. per acre and the twenty-five peasant farmers in the block took advantage of the scheme: up to the present, however, only £72 of the £353 due for hire charges has been recovered.

136. Lower down the mechanisation scale but nevertheless of great importance, there was a welcome awakening of interest on the part of manufacturers in the Federation to the need for improved ox-drawn implements. One local firm in particular has attempted to design attachments for ox ploughs whereby one frame can be used with different simple attachments for ploughing, planting and cultivating and all for about £15. Many farmers and certainly many of the extension staff were very favourably impressed.

137. A most important step in the right direction was the appointment to the staff of the Specialist Services of an Agricultural Officer (Engineering). This officer—an African graduate in engineering of Leeds University—assumed duty in January, 1962, after post-graduate studies in the agricultural engineering problems of small farmers. An earlier attempt was made some years ago to set up this branch of the Department but the officer appointed proved unsuited. In the meantime the subject has assumed more definite proportions.

PART III—AGRICULTURAL RESEARCH AND SPECIALIST SERVICES

GENERAL

138. Staff changes since mid-1960 included the resignations of two plant breeders, one herbage chemist and one soil scientist. Fortunately one senior soil scientist has re-joined the staff on loan from the Colonial Pool of Soil Scientists for a period of three years. An African graduate with engineering qualifications is assuming a new post of Agricultural Officer (Engineering) and has been assigned to the Research and Specialist Services.

139. The projected annual "Bulletin" of the Department, mentioned in last year's report, was not proceeded with, partly because the Rhodesian Agricultural Journal is to be modified and the Agricultural Research Council intends to be particularly active in this field.

140. The new Regional Experiment Station at Magoye in the Southern Province (location roughly 16° S. by 27½° E.) was carefully planned and prepared during the year in readiness for a full experimental programme in 1961–62. The station comprises 800 acres of typical "Upper Valley" type soils. Approximately 100 acres were cleared and appropriate buildings erected, under the guidance of the Agricultural Officer (Experiments) of the region and the Farm Manager. In the Northern Province the Regional Experiment Station, started in 1958 at Misamfu, continued to make good progress. Negotiations were continued for the acquisition of a good site for a Regional Experiment Station near Fort Jameson in the Eastern Province. The proposed distribution or decentralisation of research should provide reasonably sound coverage of the crop-husbandry problems of the country. On the animal husbandry side investigational work was planned and will shortly begin in the low-rainfall sandveld regions lying mainly in the southern and eastern regions of Northern Rhodesia and comprising a vast area that is the mainstay of the cattle industry of the country.

141. Liaison between the research and the extension wings of the Department was maintained and indeed improved: co-operation between the Department's staff and the staffs of other departments Territorial and Federal was noticeably good. In this connection the influence of the Agricultural Research Council was obviously stimulating and beneficial.

142. Rainfall was adequate in amount and distribution over most of the country and crop yields were generally good with maize breaking its previous records for yields per acre. At Mount Makulu the 1960-61 season's rainfall of 36.81 in. was four inches over average; rainfall here " was in excess of the calculated potential evapo-transpiration for the four months December to March and there may be a link here with the yields of arable crops which were generally better than the previous season, when rainfall was less than potential evapo-transpiration in January and March ", to quote the Ecologist's report.

SOIL SCIENCE AND SURVEY

143. Owing to lack of staff it was necessary to enlist the assistance of the soil surveyors of the Federal Department of Research and Specialist Services in the survey of a proposed irrigation area near Sinazongwe on the Northern Rhodesian side of Lake Kariba in the Zambezi Valley. Investigations are continuing into the possibility of an experiment station to serve the area. Near Mumbwa, in the Central Province, detailed soil surveys which are now being followed by trial plots, were carried out in an area more or less uninhabited, which shows promise for development based on cotton as the main crop.

144. The preparation and provision of maps and photographic mosaics was an important part of the work of the section. Contact with the agricultural planning officers on the problems of regional planning was maintained to the point where all can be regarded as members of one team.

CHEMISTRY

145. Analytical services to other sections (1,500 soil samples, 7,300 herbage samples) accounted for a large part of the work of the Chemistry Section, as usual. Increasing attention was, however, given to experimental work on " pops " or empty pods in groundnuts, soil acidity and nitrogenous fertilisers.

146. In regard to " pops ", liming with amounts up to 900 lb. per acre, led on the whole to some increase in yield at a range of centres in the northern parts of the country where the phenomenon is widespread; application of boron had the effect at a few centres of raising yields slightly; but the Chemist noted " that agricultural lime is not the final answer. The Ca from the lime seems to cure the ' pops ' but other plant nutrients have to be added to raise yields to an economic level ".

147. In the course of provincial trials to compare the effectiveness of nitrogenous fertiliser in the form of ammonium sulphate, calcium ammonium nitrate and urea, a dramatic side effect was revealed in the response to sulphur at Misamfu in the Northern Province, where the maize test crop under ammonium sulphate gave a yield which was considerably in excess of that under the other two sulphurless forms of nitrogen. The same severe sulphur shortage and the vast superiority of ammonium sulphate over the other forms of nitrogenous fertiliser, were found at Mpika, also in the Northern Province. Leaf analysis confirmed that the figure for sulphur was consistently low in the urea and calcium ammonium nitrate treatments at these centres. Further experiments were put in hand to find how widespread the occurrence may be.

GRASSLAND RESEARCH

148. Studies of grass growth were continued at Mount Makulu: these have given an understanding of how quantity and quality of herbage vary with time-of-year and with species and how they can be manipulated, within measured limits, by such management practices as cutting and fertilising. The trials in 1960-61 revealed no major contradictions to the results from earlier seasons.

149. Frequent defoliation (cutting) of Hyparrhenia-dominant grassland has been altering the composition of the sward over the past four years towards a lower-growing association of species to give, apparently, a rising level of yield per acre. Regular defoliation during the wet season in the Setaria-dominant grassland in the " damboes " (seasonally flooded natural grasslands, normally reserved for dry-season grazing) cannot be relied upon from the evidence of experiments over three years to give a " late bite ", i.e. when the Hyparrhenia and other grassland types are losing their value with the onset of the dry season.

150. Nitrogenous manuring produced very substantially increased yields of dry matter and crude protein on both natural and cultivated pastures at several centres; phosphatic manuring led in general to small increases, while manuring of cultivated pastures with agricultural lime and with potassium chloride tended to reduce yields. *Chloris gayana* (var. giant Rhodes grass) gave dry-matter yields as high as 8,000 lb. per acre, with a weighted crude protein content of 13.75 per cent. when ammonium sulphate was applied at a rate of 1,500 lb. per acre; the yield increase was linear, at least up to applications of the order of 1,000 lb. per acre, and there was some slight indication of interaction by potash and phosphate with nitrogen at higher levels of the latter; but it was only at the higher levels, as the potential limit for increase in bulk was approached, that crude protein accumulated in the herbage in excess of the normal. Putting some of these findings into practice, it was shown with test groups of Afrikaner-Devon steers on two varieties of heavily fertilised Rhodes grass pasture (ammonium sulphate 1,000 lb. per acre per annum) with the rainy-season surplus fed back in the dry season

as hay and silage, that an area of approximately 1.4 acre per beast gave a liveweight gain of about 2 lb. per beast per day over the rainy season, and maintained body weight over the rest of the year. A new trial with sheep gave promising indications that the legume *Glycine javanica* incorporated in a Rhodes grass pasture could replace a very considerable dressing of ammonium sulphate, at a fraction of the cost.

151. A group of trials on natural Hyparrhenia grassland at Mazabuka showed, in conformity with Mount Makulu findings, that the use of nitrogenous fertilisers results in a large increase in both herbage yield and in percentage of crude protein, that only a low-quality fodder could be harvested from the natural grassland unless nitrogenous fertilisers are used, and that the qualitative deficiency of the Hyparrhenia veld in the dry season was such that cattle could not maintain weight, whatever the extent of the available grazing. Dry-season supplementation of the protein fraction by the provision of good-quality hay—i.e. in this context, hay where the crude protein percentage has been raised through nitrogenous fertilising—or of supplementary protein feeds or urea, not only relieved the dietary protein deficiency but because of an increase in forage intake helped also to alleviate deficiency in dietary energy. It is well known, however, that cattle have the ability to recuperate after a period of under-nutrition: some interesting measurements on this phenomenon have emerged from the Mazabuka work: for example if the condition of a beast is maintained during the dry season by the feeding of appropriate supplements, then the subsequent increase in weight in the following rainy season-of-plenty is much less than if the beast—at least the zebu—had been subject to its usual dry-season semi-starvation. Typically, an animal fed to maintain weight over the dry or winter season put on 200 lb. in the following rainy season, whereas an equivalent animal on nothing but the natural dry-season grassland lost 100 lb. weight in this period, only to put on 268 lb. in the rains, thus finishing only some 32 lb. under the winter-fed animal. It may be feasible to exploit such knowledge by avoiding expensive supplementary winter feed and allowing moderate losses in weight to take place in the knowledge that recovery will be marked on the cheaply-produced grass of the rainy season.

PLANT BREEDING

Grain Legumes

152. The Plant Breeder (Legumes) carried out a very full season's work before he left for a three-years' course in America.

153. Thirty groundnuts trials were laid down, the majority in the Southern Province, necessitating great care and attention by the district staff. Generally speaking, Makulu Red continued as the leading variety, normally well ahead of all other bunch types. Correct time-of-lifting has been proved as an important aid to getting the most out of the groundnut crop; latitude in time-of-lifting is certainly not much more than two weeks, and with late-lifting both yield and quality fall; it has sometimes been mistakenly assumed when a late-lifted crop was examined and found to contain large numbers of shrivelled kernels, that the crop had not been allowed enough time to mature, whereas in fact many of the matured pods were probably left behind in the ground. Even in dry conditions, the crop cannot be left indefinitely in the ground because the peduncles become brittle and are easily broken on lifting, whilst a protracted wet season can lead to heavy loss of the best pods, if lifting is delayed. The optimum time for the lifting of Makulu Red was around 150 days after planting, on the plateau, but was apparently a much shorter period—probably around 120 days—in the Zambezi Valley.

154. Soya bean trials at Mount Makulu gave high yields, with Hernon 135 outstanding at over 2,500 lb. per acre. A variety trial in the Southern Province and another in the North-Western Province, averaged 1,640 and 907 lb. per acre respectively. These were respectable yields, indicating that the problem with soya is not so much to show that the crop is promising agriculturally, but rather to find economic markets for it.

Wheat

155. The Plant Breeder (Wheat) who resigned in mid-1961 to take up an appointment in England, carried out a very full programme and rounded off much of the varietal and agronomic work on wheat before he left. *Helminthosporium sativum* again shows up as a major restraint on summer-season wheat yields and therefore crosses involving *Helminthosporium* resistant varieties will be important for continuing improvement. The variety Makulu No. 1, however, remained comparatively free of the disease when grown in isolation from susceptible varieties. It has been shown that summer or rainy-season wheat is never likely to be able to compete with a perfectly adapted crop such as maize until a drastic improvement in yield is effected, perhaps through a better understanding of the physiology of the plant. The Plant Breeder made a start on this approach and showed that respiration in a wheat variety selected for the dry (cold) season was at a higher rate than in a rainy-season variety.

Sorghum

156. The Plant Breeder (General) was working mainly with sorghums and to a lesser extent with bulrush and finger millets and cassava. Straightforward progress was made in the search for sorghum varieties combining the qualities—known to be difficult to reconcile—of

good malting property and high yield. Certainly the good malting K.2 Red suffers heavily from bird damage and smut, but selections amongst the segregates in a fourth-generation cross designed to bring in bird resistance showed promise of high yield with good quality. The variety Framida, considered suitable for making malt, greatly out-yielded K.2 Red (unimproved) in a variety trial and gave the good absolute yield of 3,690 lb. to the acre. In other trials Framida did well at one centre in the north (Mushota), giving over 2,370 lb. per acre, but failed at other centres, and the general pattern emerged that sorghum varieties are markedly sensitive to locality and that a variety which broadly fits the whole country—as with cotton for instance—is unlikely to be found. “Polycross” varieties of bulrush millet, originally obtained from Bechuanaland, showed an average protein content of the grain as high as 14.9 per cent. Breeding work with the small grains made normal progress. Work on cassava (*Manihot utilissima*) continued on orthodox lines, i.e. selection for yield and for resistance to mosaic disease, and investigation on the breakdown of resistance to mosaic.

157. Manuring trials on the small grains this season showed only little response to added nitrogen, even to applications as large as 120 lb. per acre of nitrogen; and at least with sorghum the size of plant populations had a much greater influence than manuring on yield.

AGRONOMY

158. A very large number of experiments both at Mount Makulu (18) and in the districts (37) came under the general charge of the Agronomy Section and only an indication of results can be given here.

Cotton

159. Cotton has shown itself on the evidence of the past four years to be a crop of promise in several provinces, and the Agronomist is having to divert much of his time to advisory work in districts where cotton growing is now being given a commercial trial under fairly intensive supervision. The variety Albar 637 held a good steady place in most trials and (as in Southern Rhodesia and Nyasaland) looks likely to remain the stock commercial variety of the near future.

160. In two variety trials at Mount Makulu, two in the Eastern Province and one each in Barotseland, the Southern Province and the Central Province, Albar 637 gave yields of seed cotton at rates of 1,606, 1,895, 1,434, 1,710, 337, 1,867 and 2,350 lb. per acre respectively. The low Barotseland result was due to excessively high floods in the Zambezi Valley, but a small plot on a drier site in the same area yielded at the rate of over 2,500 lb. of seed cotton per acre.

161. Four pairs of plots testing sprayed versus unsprayed cotton at centres where there was already some doubt about the suitability of the crop were failures, taking the somewhat arbitrary seed cotton yield of 1,000 lb. per acre as the pass-mark; but six other pairs of plots in what are now coming to be regarded as the promising cotton areas averaged 1,475 lb. per acre in the sprayed sections and 524 lb. in the unsprayed.

162. Trials of spacing and time-of-planting at Mount Makulu confirmed previous experience that the recommended 3 ft. $\times$ 1 ft. spacing is generally suitable, although considerable latitude can be allowed with spacing when the planting is early. Early planting, i.e. as soon as the rains break, is essential for maximum yields. In a fertiliser trial at Mount Makulu, only a small response to the application of 40 lb. per acre of nitrogen (200 lb. ammonium sulphate) was obtained in terms of seed cotton yield, but a very large increase in weight of stalks.

Maize

163. Throughout the Rhodesias yields were notably above average: maximum plot yields at Mount Makulu went over forty-two bags (200 lb.) to the acre. These yields were obtained with heavy dressings of nitrogenous fertilisers, but even using ammonium sulphate at the comparatively low rate of 300 lb. per acre production was still over the thirty-two bag per acre level. The time and manner of application of nitrogen seemed not to matter at all within wide limits this season. Spacing had no major effect within the range 10,000–22,000 plants to the acre. Delay in time-of-planting led as usual to a remarkable drop in yield: at ten-day planting intervals from mid-November to the end of December yield over the five successive dates of planting ran in round figures, 40, 35, 27, 22 and 13 bags per acre. The penalty for unpreparedness is heavy in Northern Rhodesia as has been shown by trials over the years for a range of crops, and particularly for maize and cotton, and the rewards for timely planting—and this is where mechanisation could make its impact felt first in African agriculture—correspondingly great.

164. Plant populations are often absurdly low in the districts and here, too, mechanisation might help. In a trial on Mount Makulu, designed to measure the drop in yield due to very low populations, the season was so favourable to maize that even from as few as 2,000 plants to the acre the yield was still eight bags, rising to nearly sixteen bags with a doubling of the population, and thereafter rising steadily, although at a much decreasing rate, with every increment of 2,000 plants, to a maximum of nearly twenty-nine bags from 14,000 plants to the acre. Response to nitrogenous fertiliser was low for maize in this particular trial, possibly because

the site had been under soya bean in the previous season. But with a negligible response at the two lowest populations and a highly significant (35 per cent.) increase from the added nitrogen at the three highest populations, the possibility certainly exists that nitrogen is comparatively ineffective at the low populations normally achieved by peasant growers, who therefore fail to obtain the full benefit from the costly fertiliser which they are now beginning to use.

Miscellaneous Crops

165. The long-continued rains which favoured other crops led to difficulties in the curing of Turkish tobacco and thus to below-average quality; and the Pathologist notes that "bushy top virus disease was found to be common and widespread in the Territory". Trials on the manuring of Turkish tobacco, generally speaking, confirmed the already considerable knowledge of the requirements of this crop, where the problem now is largely one of getting the grower to practise what is preached by the extension staff. A small plot of the variety Kentucky 9 of the air-cured Burley group of tobaccos was grown on the heavy soils of Mount Makulu suited to this group; the variety proved relatively resistant to wildfire (*Pseudomonas tabacum*) and gave the moderately good yield of 1,170 lb. per acre of good quality leaf.

166. Sunflowers showed little response to nitrogenous or phosphatic fertilisers this season. Russian Giant was the outstanding variety in trials, not only at Mount Makulu, where it yielded at the rate of 1,580 lb. seed per acre, but also in the provinces where in ten trials it led the field on nine occasions and averaged 1,345 lb. per acre.

ANIMAL HUSBANDRY

167. The Animal Husbandry Officer reported from Mazabuka that the Nucleus Breeding Scheme proceeded according to plan. The selected F2 animals in the Boran herd showed little weight improvement over their F1 progenitors, presumably because there had already been a high degree of selection and thus reduction of variability in the European-managed herds from which the stock was obtained, whereas selected F2s in the Angoni herd, derived from unselected stock and possessing more scope for alteration of the genotype, showed a significant improvement over their corresponding F1s. Some fifty-two calves were selected as possible bulls for the scheme and a further 100 saved for distribution to the districts.

168. Work on the mechanism of heat control in the Zebu indicated that "sweating" as a means of heat regulation was less important than an increase in respiration rate. Indigenous cattle are capable of withstanding all but very high temperatures of exceptional duration. The recovery period from a body temperature of 40°C, for the exotic *Bos taurus* took over eight hours whereas for the Zebu (*B. indicus*), the recovery period was 2.5 ± 0.5 hours. Work on changes in the rumen environment established that sodium exercises control in Zebu cattle and not potassium as in European breeds (*B. taurus*).

169. In other nutrition studies it was shown that the feeding of iron and copper in combination with other recognised dry-season supplements measurably increased the rate of maturation of cattle. A "blood survey" covering most of the Territory revealed a general inadequacy of sodium, with deficiencies in iron and copper in the lighter soil areas. Low availability of copper may be more widespread than was at first thought. Work was continued on the implantation of the hormone Hexoestrol in cattle, which are making use of the dry-season grazing on the Kafue Flats, to find if gain in weight could be influenced; there were indications that maturation of cattle in the age groups $2\frac{1}{2}$ – $2\frac{3}{4}$ years (but not less) could be altered significantly by the treatments.

PLANT PATHOLOGY

170. Much of the time of the Plant Pathologist, who is also Botanist to the Department, was occupied in advisory work and survey, involving much travelling.

171. Many experiments in the control of pests and diseases were carried out in co-operation with other sections and are largely reported elsewhere. Very nearly perfect control of beanfly stem maggot was achieved through the use of "Endrin", "Dieldrin" and "B.H.C." as seed dressings. The potato variety Loman again proved a high yielder, and the variety Susanna showed promise, remaining free from late blight in the midst of heavily infected varieties. The yields of the blight-susceptible Up-to-Date and Arran Chief varieties showed some improvement from spraying with "Zineb".

172. An eelworm survey of Barotseland was carried out in collaboration with the senior helminthologist of the Federal Department of Research and Specialist Services. The common root-knot nematode *Meloidogyne javanica* was abundant and widespread.

MOUNT MAKULU CENTRAL AGRICULTURAL RESEARCH STATION

173. Many parties of visitors, European as well as African, were shown round the farm, and particular interest was often shown in the management of the crop of Makulu Red ground-nuts being bulked for seed. This crop yielded 1,500 lb. of kernels to the acre and was largely handled mechanically: planting on the three-feet ridges was carried out satisfactorily by

mechanical planter, a tie-ridging machine made a good job of cultivating the rows, and a side-delivery rake made a surprisingly good job of clearing weeds between the groundnut plants without damaging them. Only one light hand-hoeing had to be given to this crop. No real difficulty was experienced in harvesting the crop mechanically, but the stripping of the pods from the haulms, and the shelling of the nuts, did give rise to difficulties: the best sheller still produced 6 per cent. breakages. Stripping and shelling machines, pre-grading of the nuts, the uniformity of the pods on the vines and resistance of the nuts to breakage call for further attention from engineers or plant breeders.

174. A field in its second year of a giant Rhodes grass ley put up a good performance, being grazed heavily until the end of December, when it was closed for a month and then cut for silage, of which it produced eight tons to the acre. After a further rest—and a second application of ammonium sulphate to bring the total to 400 lb. per acre for the season—it yielded 2.8 tons per acre of good quality hay.

MISAMFU REGIONAL EXPERIMENT STATION (NORTHERN PROVINCE)

175. The emphasis on experimental work at Misamfu was slanted from the testing of agricultural practices and crop varieties to the problem of soil fertility. Much of the soil of the north is so poor that raising of fertility is the necessary prelude to the raising of yields to worth-while levels, and a large series of long-term trials bearing on this was put in train.

176. Investigations have been started on coffee, an indigenous essential oil crop called "Nindi" (*Aeolanthus myrianthus*), and tea. Arabica coffee has been grown on a limited scale for many years, but recently African growers have taken to the crop and the outlook is promising, if the comparatively plentiful water supplies of the region can be harnessed for supplementary irrigation. Mulching was again shown to be of marked benefit to unirrigated coffee, and nitrogen, and in some areas, sulphur also, played vital roles; a range of experiments is in progress. The agricultural problems of Nindi were put in hand but will take time: the technical problems of distillation were successfully overcome thanks to some excellent work by the Research Assistant assigned specially for the job from the Chemical Section at Mount Makulu.

M. HALCROW,
Director of Agriculture.

PART IV—CO-OPERATIVE SOCIETIES AND AFRICAN MARKETING

INTRODUCTION

177. This Part deals primarily with the work of the Department of Co-operatives and African Marketing. It should be noted, in this connection, that Ministerial responsibility for Co-operative Societies is shared. Responsibility for those Societies whose members are mainly non-African rests with the Minister of Finance to whom the Director, as Registrar of Co-operatives, is responsible in this field. The Director also undertakes various other duties on behalf of other Ministries. He is, for instance, Registrar of Trade Unions (Ministry of Labour and Mines) and Registrar of Building Societies (Ministry of Finance); such activities are not reported on in this Part.

178. Horace Plunkett, a "founding father" of the agricultural co-operative movement, laid great stress in many of his writings on the necessity for "better farming, better business and better living". In his view, better business came first as the foundation for better farming and better living. He was, however, thinking in the context of the more advanced agricultural industry of the Northern Hemisphere, and in Central Africa all concerned with marketing realise that the need for improved agricultural techniques is of paramount importance, and without such improvement attempts at development in other fields rest on unsound foundations. Even so, the weather remains the farmer's first concern, and this last year conditions in the Territory were excellent. Almost everywhere, especially in the main produce growing areas, record crops were the rule; deliveries by African farmers of maize, the staple food crop, to the Grain Marketing Board had, up to the end of 1961, accounted for over 40 per cent. of the total received. A pleasing feature of the African farmers' maize deliveries to the Grain Marketing Board was that 78 per cent. was Class "A"; by comparison 75 per cent. of the deliveries by European farmers was of this top grade. In the field, where there was most need for improved techniques, better farming has resulted in both better business and better living.

179. With the increase in production has come a reduction in the price paid per bag of maize by the Grain Marketing Board. This was inevitable as soon as the supply exceeded demand and there was a consequent need to export in increasing quantities to outside markets where the world price is dropping. It is clear therefore that, as far as the African farmer is concerned, he must look for better business and better living in the future by diversifying his crops as far as the land and climate permit, by increasing his yield per acre and by reducing his costs of production.

GENERAL PROGRESS

180. The agricultural co-operative movement has had a uniformly successful year and, in consequence of the good preceding year of 1960, at the end of 1961 finds itself in a strong position with the trials consequent upon the 1958 disastrous year of crop failure put well behind. The year 1961 has been one of consolidation; the number of societies has remained virtually the same, although membership has risen once more for the fifteenth successive year, this in spite of an intentional pause this year in the drive for membership. The greatest attention has been paid to putting the internal administration of agricultural co-operatives on a sound basis, consolidating and streamlining wherever possible to meet the strains imposed by falling prices and more intensive competition. A bumper harvest has resulted in a great increase in turnover, while the administrative reforms have ensured that the marketing organisations have met the heavy strain competently and profitably.

181. Co-operative thrift societies have in general had a successful year, although the movement in the Copperbelt has received a setback due to the decision of the Western Province Local Education Authority that facilities for the collection at source of saving contributions made by African teachers should cease. The co-operative consumer movement is still relatively unimportant although several thriving societies prove that where the people want such societies they can be of real value; but with the generally depressed conditions still prevailing in the world of commerce, there is little present incentive for the formation of new societies of this type. In rural areas agricultural producer societies continue to expand their consumer trade in farmers' supplies, and play an important part in this field.

182. At Appendix VII, Part I, are set out details of societies as at 31st December, 1961, and at Part II of that Appendix is a summary of the figures over the past five years. At Appendix VIII is listed the volume and value of crops marketed co-operatively in 1961.

183. It will be noted that members' business in produce has now risen to approximately 60 per cent. of the total handled. The ideal is, of course, that all business should be done with members only; but in this respect co-operatives face a problem. They are usually, in fact it is fair to say invariably, the largest and most efficient marketing organisation in the rural areas in which they operate. Their members now account for the bulk of the produce marketed from their areas. But outside the societies' membership lies a vast number of small subsistence producers who need an outlet for their surplus subsistence produce. For co-operatives to deny them the use of co-operative marketing facilities would be contrary to the public interest,

and for that matter, to the wishes of the co-operative members themselves. For similar reasons price discrimination by co-operatives against non-members is frowned on, as being tantamount to forcing membership of a co-operative on individuals. Co-operative members therefore only derive exclusive direct benefits from their active participation in the agricultural industry when there are profits to share as bonuses; this year for example bonuses on groundnuts paid by Eastern Province societies on the 1960 trading profits varied from nil to 7s. 6d. per bag (depending upon the efficiency of the various societies) and interest on share capital from 5 per cent. to 10 per cent. When the accounts for 1961 are completed, similar distributions are expected in respect of this year's produce trading. But in a bad year, when profits are negligible, as in 1958, members get no bonus; they then see themselves no better off by virtue of their membership than non-members and there is an understandable and immediate adverse reaction against having to shoulder responsibilities for which no return is given.

184. It is, in fact, unreasonable to expect that the hard-worked farmer, struggling with falling prices, adverse weather, crop pests and the many other daily difficulties of his calling, should take an over-altruistic attitude towards such matters. The view that it is improper to force co-operation on an individual has, in fact, very little to support it outside pure dogma. No objection is raised to schemes requiring farmers to use fertilisers in return for acreage bonus subsidies; a farmer can, it is argued, stay out of such schemes and suffer the consequences. There seems no real equitable reason why the same argument should not prevail as regards marketing projects; if a farmer chooses to remain outside a voluntary movement, then he should be left to suffer the consequences; at present, however, many expect the best of both worlds—the advantages of co-operative marketing facilities without the responsibilities that membership of a society entails.

RURAL CREDIT SOCIETIES

185. The facilities offered elsewhere by this type of society are, in general, provided in Northern Rhodesia by the agricultural marketing societies where co-operatives are active. Rural credit on a fairly extensive scale is also provided from Government sources, either from special funds from which medium or long-term loans are made or in the form of short-term crop finance. The provincial African Farming Improvement Funds provide another source of loan funds in the areas in which they operate. European farmers' requirements are, in general, met through the Land and Agricultural Bank, which became the responsibility of the Federal Government on 1st July, 1961.

186. There are thus only three co-operative societies in this class, one of European tobacco growers, now being wound up consequent upon its functions having been assumed by the Federal Government, one of African fishermen and one which confines its activities to African rural commerce and minor industry.

187. The determined effort made in 1960 to call in overdue rural credit loans made to members by agricultural marketing societies, was continued this year, and the bumper harvest facilitated recoveries on a most welcome scale; in fact considerable recovery was made of sums already written off in societies' accounts as bad debts. The comparative simplicity of recovering agricultural loans out of the proceeds of a farmer's crop has been demonstrated in no uncertain terms, and has served not only to emphasise the strong claim of co-operatives to be regarded as a useful method of channelling rural credit to African farmers, but to substantiate their claim to be the best and most efficient way of doing so, thus enabling the farmer to use effectively the one real asset he can offer as security for credit, his productive power. Only when this is converted into a charge on a crop does this become a tangible, commercially valuable asset. This is in line with the thinking in the report of the Working Party on Rural Economic Development which was published in November, 1960, and which explicitly calls for agricultural credit to the African farmer to be put on a sound commercial basis, with a clear distinction made between commercial credit and subsidised support of agricultural development projects.

188. With the improvement in agricultural techniques, the increased pace of development in the marketing field, and the likelihood of developments in land tenure to enable African commercial farmers to develop on a more stable, long-term basis, agricultural credit is likely to require much more detailed attention by way of rationalisation and consolidation than hitherto. Dr. Horace Belshaw,¹ in commenting on the close connection between price policy for agricultural produce and agricultural credit policy, stresses the difficulty of introducing private commercial credit into agriculture in the face of competition from Government lending agencies, which are usually essential if agricultural credit is to be effective, unless a careful balance is maintained between the operations of these two main sources of credit.

189. It is likely that agricultural credit agencies will have to be comprehensively reviewed in 1962 and a clearly defined pattern of future development adopted. This should be based on a more economic or commercial approach to normal seasonal and productive credit, with government responsibilities for what Belshaw² terms social overhead resting firmly on government institutions. In solving these problems, the co-operative approach has many advantages, not the least of which is the comparatively simple exploitation as security of the farmers' main tangible asset, the proceeds of his crop.

¹ In "Agricultural Credit in Economically Underdeveloped Countries" by Dr. Horace Belshaw, Macarthur Professor of Economics, Victoria University of Wellington, New Zealand (F.A.O. Agricultural Study Paper No. 46 1959).

² Op. cit.

THRIFT SOCIETIES

190. Although the number of societies in this category has dropped by four during the year, aggregate membership of the whole group has increased from 4,341 to 5,981 and there has been a steady rise in deposits. The co-operative thrift movement received a blow in the Copperbelt during the year when the Western Province Local Education Authority withdrew contribution at source facilities previously enjoyed by several societies whose members were teachers.

191. This type of society still suffers, however, from a too rapid turnover in funds, due to the use of a member's savings account as a current drawing account. Steps to correct this failing have been partially successful during the year, but much educational work has to be done in this field. Thrift societies still suffer, also, from a lack of skilled, competent voluntary officers to undertake their administration. It is this which caused the cancellation of four such societies' registration during the year. Societies of this type can expect only a limited surplus from the investment of members' savings deposits and in consequence can rarely afford to pay for skilled administration, unless they are very large. This dependence on voluntary work severely limits the scope for development in this field.

192. At Part I of Appendix VII will be found details of these societies.

CENTRAL FINANCE

193. European marketing societies usually draw their finance from the Land and Agricultural Bank. As regards societies with African membership, considerable progress is being made towards making them independent of Government facilities. Originally Government provided all the funds which these societies required for crop purchase finance. The next step was to educate the societies in the use of banking facilities; as, however, the societies were unable to offer suitable commercial security, Government enabled them to operate on bank overdrafts by providing seasonal guarantees to the banks to cover such overdrafts. Gradually, as the societies have built up their own financial resources, the amount of Government guarantees has been progressively reduced, until in the area of greatest co-operative activity (the Eastern Province) the commercial bank was satisfied with a guarantee by the Government covering only 10 per cent. of the total lent by the bank. Political uncertainties this last year have, however, caused a setback in the progress on the financial front; the security aspect of the rural situation has appeared to the bank to have greatly increased the risk to their funds while invested in crops stored in rural areas. Government, therefore, has been called on to provide guarantees over the normal commercial 10 per cent. to a total of 50 per cent. for as long as the political conditions, in the opinion of the finance house, indicate a high degree of risk to their capital.

194. The degree to which societies can as yet finance themselves for crop purchase requirements varies, of course, from province to province. In the second largest co-operative area (the Southern Province) one union only required approximately 35 per cent. of Government cover, while in Barotseland a small but carefully husbanded group of societies was able to dispense with Government guarantees this year. Interest charges ranged from 6 per cent. to 7½ per cent. per annum, interest rates being raised generally by ½ per cent. on 1st June 1961. Short term finance exceeding £1¼ million was raised by societies during the year, while medium and long term loans carried by societies at the end of the year were over £1½ million.

195. There has been in general a considerable improvement in the overall loan position, i.e. the indebtedness of members to their societies and of societies to lending institutions. Opportunity was taken of the successful years in 1960 and 1961 to increase stabilisation and other reserve funds, and in general, societies with African membership have shown the greatest relative improvement in this field.

CONSUMER SUPPLY SOCIETIES

196. Consumer societies form only a small section of the co-operative movement in the Territory, and the greater part of all co-operative consumer supply business is still that carried on by producer marketing societies as a service to their farmer members and the general public. Where consumer societies have established themselves they are, however, in most cases providing a valuable service and doing well. Their membership remained more or less static during the year, with an increase of only forty-nine on 1960, in spite of the cancellation of registration of six moribund societies.

197. One of the disappointing and unexpected failures in this field has been that of the Co-operative Traders' Association. There is, it is believed, both a desire and a need for joint purchasing organisations by the small trader, especially in the African rural areas, but no such association has so far managed to establish itself. Lack of finance has not been the problem; for a successful society this can always be found. The lack of progress has been due exclusively to management failure and the failure of members to use their associations. It is difficult to see a future for this type of organisation until there is a surplus of competent African management staff available and until the small African trader has a more secure basis for his operations, and shows a greater willingness to support his own organisations. The present time, with the generally difficult conditions prevailing in the retail trade, is not, anyway, favourable to de-

velopment in this field. The valuable services provided by agricultural marketing societies in this field is apparent if we compare the total turnover for the year of African consumer societies of approximately £25,000, with the consumer supply business done by marketing societies in the year, which exceeded £100,000.

198. Details of these societies are set out in Part I of Appendix VII.

PRODUCER MARKETING SOCIETIES

199. The year 1961 has been another excellent one for agricultural marketing societies, and they have taken advantage of the massive harvest to strengthen their position.

200. In the Eastern Province the introduction of strict budgeting from primary society level right up to tertiary society level has proved eminently successful. Costs have been cut to a level which ensures the maximum return to the farmer with the minimum expense being incurred on the marketing operation. The loan burden of societies has been drastically reduced, and their credit worthiness improved to the point where, if it were not for the temporary uncertainties of the political situation which impairs credit secured by crops held in rural areas, the co-operatives would finance about 90 per cent. of their business from their own resources. In spite of the registration of only one new producer society in the province during the year, membership has risen by over 200 in 1960 to nearly 14,000 and compared with 1958 there are now 3,000 more co-operative farmer members. Paid-up share capital of primary societies alone increased by over £9,000 to nearly £14,000, with a total for all agricultural marketing societies of £38,000; reserves now stand at nearly £200,000. A total of nearly 220,000 bags of produce was purchased during this year, of which over 62 per cent. was from members, in some areas the figure rising as high as 74.6 per cent. The value to the producer of these purchases was nearly £½ million, the selling value being close on £1 million, a figure exceeding the aggregate value of the entire African marketed produce surplus of the Southern Province, which has, with part of the Central Province, for long been regarded as the granary of the Territory.

201. Steps are in hand to place marketing in the Eastern Province on a basis closer to that prevailing in the Southern and Central Provinces, by the elimination of transport and other pooling systems which tend to penalise the producer close to the main roads in favour of maintaining uniform district or provincial prices for the main crops, namely groundnuts and maize. The Province suffers severely from its geographical situation, its lines of communication being lengthy and dependent on comparatively expensive road haulage. The Province's crop cannot, using normal transport facilities, be cleared before the rains break. Consequently the farmer is burdened with extra storage and fumigation charges, in addition to the high costs of getting his crop to the point of sale, which his counterpart on the line of rail does not bear.

202. An important aspect of the improved position in the Eastern Province has been the greater part now being played by the primary societies, on whose overall effectiveness the whole co-operative movement ultimately depends.

203. In the area second in co-operative activity, the Southern Province, excluding the Mazabuka District, the reorganisation of five secondary marketing organisations into two large and stronger marketing unions has resulted in a general improvement in efficiency and an ability to reduce costs. No new primary producer societies were formed during the year, but membership of existing societies rose by 9 per cent. to over 3,000. There was another record harvest this year and purchases, mainly of maize, exceeded ¼ million bags, worth some £285,000 to the producer. Although the bulk of all purchases was maize for delivery to the Grain Marketing Board, export of cowpeas, velvet beans and sunnhemp was effected, these exports going as far afield as Australia and Japan. A pleasing feature of the co-operatives' deliveries from this province was the high percentage of Class "A" maize, 187,000 bags out of the total. In 1960, Class "A" was 72% of the total African deliveries, Class "B" 21%; in 1961 the figure for Class "A" was 86.5% and 11.07% for Class "B". (Co-operative deliveries in this respect show up more favourably than those of the departmental African Rural Marketing Service deliveries from the same Province, whose figures were 80.8% Class "A" and 16.1% Class "B").

204. In Barotseland a small, thriving group of societies with their own marketing union is based on Mankoya, the main production centre, the selling centre being Mongu. The volume of crops handled rose by 20% over the previous year, society membership increased by 25%, paid up share capital by 60% and the proportion of member to non-member deliveries to markets from 77% to 93% of the total purchased. A total of 22 markets covered some 2,500 square miles of country and purchased 6,071 bags of produce (mostly maize and groundnuts) at a cost of £8,292 and selling for some £17,000, after transporting the crop 150-200 miles. This is a small group, still little beyond the pilot stage, which faces severe problems in shortage of skilled management and a widely fluctuating, unpredictable market. The demand in Mongu varies greatly, depending upon the effect which the annual Zambezi flood has on the local Mongu crop; the Mongu market is strictly limited and the transition from conditions of plenty to those of shortage can occur with startling rapidity.

205. In the Northern and Luapula Provinces, political disturbances have disrupted economic activities during the latter half of the year, but in spite of this trouble, food buying was carried out successfully in six districts stretching from Kawambwa on the Congo border to Isoka on the Tanganyika border. The harvest was good, but unfortunately was not fully marketed due to the troubled situation, and it is known that not all surplus produce was brought to market. In consequence of the disruption of the local economy, the turnover of the primary societies and of the marketing union has dropped heavily, the union's turnover from £67,000 in 1960 to £20,000 in 1961. The quantity of maize purchased by primary societies, however, rose slightly from 3,225 bags in 1960 to 3,629 bags in 1961; groundnuts fell from 790 bags to 466 bags and other crops from 1,679 bags to 1,239 bags. The actual food purchasing exercise was therefore maintained at approximately the previous year's level, in spite of acute difficulties. Consumer supply business of the union totalled £5,191. The need now is for more settled conditions.

206. In Kawambwa, in the Luapula Province, a small number of primary producer societies, grouped round the Kawambwa Marketing Union, dealt with a small local market in the neighbourhood of 1,500 bags a year. Purchases of maize dropped from 1,980 bags in 1960 to 925 bags in 1961, other crops, mainly groundnuts and beans, bringing the total up to 943 bags against a total of 2,084 bags in 1960. Here also, a return to more settled conditions is awaited; shortfall in local production was met by imports.

207. Except for a small vegetable growers' society, co-operative marketing of the main African-grown crops has still not developed in the Central Province owing to the existence of marketing schemes operated under the auspices of the African Farming Improvement Fund Boards on profit margins below the commercial level, with trading risks carried by the Boards. Also, it must be admitted, when a farmer finds a statutory Board providing his marketing service he sees no reason to take the trouble to provide his own. It is for this reason that European-produced maize is no longer handled physically by the Farmers' Co-operative Society, although for accounting and loan purposes payments by the Grain Marketing Board are routed back through the Co-operative; direct co-operative participation in marketing of European-grown maize is negligible and the Farmers' Society functions primarily as a consumer supply organisation; even its loan functions are now largely transferred to the Land Bank.

208. This tendency to hand over marketing responsibilities to Government is very clearly exemplified in the decision taken during the year by members of the large European dairy co-operative, covering the whole line-of-rail area except Livingstone, to dissolve voluntarily and be absorbed by the Federal Dairy Marketing Board. In Livingstone, however, a small group of dairy producers is continuing to market their milk co-operatively through their own small society and are, in fact, actually expanding their business.

209. The European-grown tobacco crop, mostly Virginia flue-cured is, however, still marketed co-operatively through the tobacco producers' own separate society. This year a total of over 8½ million lb. of Virginia was marketed and 40,000 lb. of Turkish, the society having a turnover of nearly £1½ m., excluding consumer goods sales of nearly £½ m.

210. Details of these societies will be found in Part I of Appendix VII to this report; in Appendix VIII are set out details of crops marketed co-operatively.

CRAFTSMEN'S SOCIETIES

211. No societies of this type are registered and none is in formation. One small un-registered group operates as a development project but has not proved economically viable.

OTHER SOCIETIES

212. Societies in this category range from social groups such as theatre and sporting clubs to agricultural show societies. The oldest society of the latter type, which is based on Lusaka, was during the year granted the title "Royal" in recognition of its long, successful devotion to agriculture and its high reputation.

213. Details of these societies are set out in Appendix VII, Part I.

EDUCATION AND PROPAGANDA

214. In times of record crops the departmental field staff in rural areas are usually so extended in the actual supervision of marketing activities that they tend to have less time than is desirable in which to educate society members; in times of poor crops, the interest of member in their societies tends to fall rapidly and to make them less responsive to educators. This dilemma is permanent, yet co-operative education is of such fundamental importance, not only to the welfare of societies, but to the long-range interests of the whole community, especially the rural African, that the dilemma must be solved. The short answer is, of course, more trained staff; it is how to meet the urgent need in face of shortage of such staff that is the crux of the problem. It has been possible this year greatly to strengthen the departmental staff in the Eastern Province, and training courses for society office holders and staff have been vigorously developed. Increased responsibilities are being undertaken by primary societies

in the Province, and steps are well in hand for the establishment of a co-operative training centre for the province. Societies are contributing generously from their own funds, one union alone having earmarked a sum of over £1,300 for this purpose.

215. Training courses have been run during the year in all societies' areas for society staff from capitaos upwards. Not only is training given in the administration of societies and the mechanics of marketing, but every opportunity is taken to try and educate members away from a reliance on old, uneconomic practices, for example, a preference for purchase by volume instead of by weight, or a refusal to cut overheads by insisting on cash payments at time of purchase instead of the more economical method of selling on credit. Slowly these efforts are having effect, and in one area an actual shortage of assayed scales arose due to an unexpected change of heart on the part of producers, who decided to change rapidly from selling by the tin measure to selling by weight.

216. The Department has also participated in training courses at various centres designed to help the African businessman, and has where necessary provided lecturers on commercial and co-operative subjects. The local provincial vernacular news sheets have also been used, as have the services of local information officers, in publicising facts and policies of interest and value to co-operative members; local district agricultural shows have also proved a valuable opportunity for making contact with a wider public, and societies provide several trophies for such shows.

217. One Senior Co-operative Assistant again attended the special nine months' training course at the Co-operative College, Loughborough, and another the Plunkett Foundation course in East Africa. One Co-operative and Marketing Officer also undertook a six months' training course in the U.S.A. under the auspices of the International Co-operation Administration.

218. The annual departmental training course for Co-operative Assistants was held from March to May, 1961, with a roll of twelve students.

MISCELLANEOUS

Direct Marketing Schemes Run by the Department

219. The African Rural Marketing Service, operating in the African rural areas of the Central Province and of the Mazabuka District of the Southern Province, again had a most successful year following a record harvest. This Service is sponsored by the Central and Southern Province A.F.I.F. Boards and is managed by the Department of Co-operatives and African Marketing. The African Rural Marketing Service, completing its second year of operation, purchased 558,864 bags of maize, valued to the farmer at £706,436, and a further 5,367 bags of other crops valued at £7,333. The selling value of the purchases totalled £900,264. Grades were higher in the Mazabuka District of the Southern Province than in the area covered by the Service in the Central Province; in the Southern Province 80.8% were Class "A", 16.1% Class "B", 1.1% Class "C" and 2% Class "D"; in the Central Province 67.8% were Class "A", 30.1% Class "B", 1.4% Class "C" and 0.7% Class "D". The Service operated 104 buying stations (34 in the Southern Province, 70 in the Central Province) for just under seven months.

220. The prices set for the 1961-62 harvest in Federal Government Notice No. 151 of 1961 were as follows:

		<i>Class S</i>	<i>Class A</i>	<i>Class B</i>	<i>Class C</i>	<i>Class D</i>	
		s. d.	s. d.	s. d.	s. d.	s. d.	
Maize			31 6	31 0	30 0	29 0 or	per bag
						valuation	
Rupoko			38 0	37 0	—	—	per bag
Kaffir Corn		40 0	38 0	35 0	—	—	per bag
Groundnuts (shelled)		100 0	90 0	87 0	—	—	per bag
		(Min.)					

The introduction of the "D" Class of maize in 1961 was to eliminate the previous reject grade below Class "C"; one of the anomalies of control was exemplified in the embarrassment caused by the reject grade; sellers could often market such maize profitably in the Grain Marketing Board area, in spite of it having been rejected by the Board. The new "D" class permits a valuation to be set on such maize and thus ensures purchase by the Board. This tends of course to make buying at bush markets by African capitaos hazardous, inasmuch as no such captao can be expected to anticipate the Board's valuation. In consequence a supplier of "D" class maize will tend to be paid the absolute minimum in the field. Fortunately deliveries of this class are very low (2 per cent. in Southern Province this year and 0.7 per cent. in the Central Province), and should not exceed 1 per cent. average over the years.

221. Finance to a total of £300,000 in overdraft facilities at 6½ per cent. per annum were provided for the Service this year: but by careful phasing of deliveries and payments the total overdraft was held to £195,000 maximum at any one time, the overdraft being cleared by 2nd October, 1961.

222. In addition to maize, 4,253 bags of sunnhemp, velvet beans, ground beans, cowpeas, Canadian Wonder beans, and sunflower seed were purchased at a cost of £7,333, compared with 2,070 bags for £4,817 in 1960. Groundnuts to a total of 2,520 bags costing £8,582 were also purchased, compared with 814 bags costing £2,970 in 1960. A total of 4,369 bags of fertilisers were distributed.

223. A gross trading profit of £54,811, net £37,573, was shown on the Service's operation in the Southern Province; in the Central Province gross profit was £36,426, nett £22,609; turnover for the year was £900,264 against £908,885 turnover for 1960, the difference being accounted for by the reduction in the scheduled price for maize from 36s. per bag in 1960 to 31s. 6d. per bag in 1961.

224. A small direct marketing scheme was again run as a local development project by the department in the Luangwa Valley area of the Lundazi District in the Eastern Province. A total of 2,033 bags of produce, mostly groundnuts, and 3,167 lb. of cotton were purchased at eleven markets, supplemented by ten temporary one-day buying stations, for £5,943, and a small operating margin of approximately £300 was cleared on the exercise.

225. In the Northern Province and the Barotseland Protectorate local famine prevention direct buying schemes on the Government's account were operated by the department. In Mongu 3,000 bags of maize were purchased for sale and had largely been cleared by the end of the year; in the Northern Province purchases were only made in areas not covered by co-operatives and for immediate sale; they totalled 1,300 bags, mostly maize at a cost of £2,286.

Audit and Supervision Fund

226. Detailed accounts covering the fund's operation of the Audit and Supervision Fund during 1961 are set out at Appendix IX, Part I to this report. The fund is slowly being built up to a figure at which it can, in accordance with the Co-operative Societies Rules, under which the fund was established, be handed over to a central co-operative audit union. A target of £20,000 is aimed at for this purpose; the fund stood at £15,662 at 31st December, 1961. Expenditure of £112 during the year was approved mostly to cover enquiries in connection with audit work on primary societies, together with a small amount of assistance by way of educational work at district agricultural shows directed towards the African farmer.

227. The growth of the fund over the last thirteen years is set out in Appendix IX, Part II, to this report.

Audit

228. It was necessary to detail two officers for full-time audit duties for the first six months of the year, partly for training purposes, partly to avoid an accumulation of work when the substantive officer went on leave during the period. In consequence no departmental audits were overdue at the end of 1961.

229. The position at 31st December, 1961, was as follows:

<i>Societies audited by Department</i>	...	...	...	200
Fully audited	...	...	...	172
Under audit	...	...	...	12
Not due for audit	...	...	...	16
				200
<i>Societies audited privately</i>	...	...	...	27
Fully audited	...	...	...	14
Awaiting or under audit	...	...	...	13
				227

230. In the case of societies audited by the Department (and it is only these societies which are required to contribute to the Audit and Supervision Fund) an improvement in book-keeping standards was noted. It was, however, noted that records other than accounting records, specially minute books, still tended far too often to be neglected. It is also still often necessary to draw attention to the necessity for a society to obey its own by-laws, or amend them to meet changed circumstances.

231. Fees charged to societies during the year totalled £1,617, a reduction from the figure of £2,342 charged during 1960: the reduction was partly due to the transfer of some large societies from reliance on the departmental auditor to the use of a private auditor, and partly due to a reduction of margins on which societies operate consequent upon the severe drop in maize prices.

Staff

232. At Appendix X is set out the Departmental staff position as at 31st December, 1961. Although the staff position improved slightly this year, for most of the period under review there has been, because of leave, absence on courses, and unfilled posts, an effective strength of only thirteen Co-operative and Marketing Officers against an authorised establishment of twenty. It has proved impossible this year to recruit overseas, and out of three vacancies advertised locally, only one was filled. At the 31st December, 1961, there were still two vacancies for Co-operative and Marketing Officers unfilled. In spite of staff shortages it has been possible to reinforce the most active centre of co-operation, the Eastern Province, with excellent results.

New Registrations and Dissolutions

233. Three societies with European membership were dissolved during the year, as were ten with African membership. Most of the African societies were small consumer or thrift societies which have become defunct for lack of interest and no losses of members' shares or deposits were involved; two primary producer societies were amalgamated to form one society. The largest society to be dissolved was the Co-operative Creameries of Northern Rhodesia Ltd., with European membership, which went into voluntary dissolution in order to facilitate absorption by the Federal Dairy Marketing Board. Two new societies, one of European and one of African membership were registered during the year.

234. Details of registrations and dissolutions are included in Part I of Appendix VII.

CONCLUSION

235. The general picture of the co-operative movement at the end of 1961 is, as far as the African agricultural producer societies are concerned, a bright one. They have taken full advantage of the excellent harvest in the main crop-producing areas and at the end of the year their finances were sound and their administrative machinery stronger. They all, however, suffer from the general shortage of skilled management staff; although every effort is made to improve training facilities, the demand is always larger than the supply. With the dissolution of the Co-operative Creameries of Northern Rhodesia Ltd., the European activity in this sector of the co-operative field is now virtually limited to the tobacco industry and a small remaining part of the dairy industry round Livingstone.

236. In the consumer field, the small African movement has had a difficult year, in common with the distributive trade generally. The largest consumer supply business is still that carried out by agricultural producer supply societies, European and African.

237. Membership of the movement has again increased this year, by very nearly 3,000 to a total of 36,413, of whom 30,000 are Africans. Turnover of all societies rose from nearly £7m. in 1960 to nearly £8½ in 1961; just under £3m. of this was achieved by African societies.

238. In the report for 1960 mention was made of the challenge facing co-operatives, and of the difficulty of reconciling the need for success, to justify official support, with the need to ensure the maximum permissible freedom, which includes the freedom to make costly mistakes, in order to ensure the development of a stable, self-governing and self-reliant co-operative movement. The horns of this dilemma remain as sharp as ever, but it has been gratifying to see that in the more developed sections of the African co-operative movement not only is a real pride in their organisation showing itself more clearly, but there is also a growing readiness to undertake more responsibility at all levels.

239. The agricultural position during this year has illustrated that perpetual anomaly facing all farmers everywhere; techniques improve and, given acceptable weather, crops increase. At the same time prices for those crops tend to fall as nearer markets are saturated and the hunt for other markets goes further afield. In more highly developed countries, especially those of Western Europe and North America, the rise in the farmer's productivity has meant a steady drift from the land into industry and commerce, with a continuously reducing number of farmers producing a continuously increasing quantity of produce. In a country such as Northern Rhodesia, the majority of whose inhabitants must live off the land, the safety valve of migration into industry is not available to the same extent. Direct participation in their own agricultural industry, which co-operatives facilitate, does hold out the hope that some of the problems facing the rural population will be more fully appreciated by the participants. Such people may be less willing to blame every misfortune on the Government, a tendency that can be noted all too clearly elsewhere when the Government, through State Boards, controls the agricultural industry at all levels.

J. B. W. WILKINSON,

Registrar of Co-operative Societies.

Director of Co-operatives and African Marketing.

24th February, 1962.

APPENDIX I

CROP PRODUCTION

AFRICAN MAIZE SALES IN 1961

	<i>Bags</i> (200 lb. net.)
To Grain Marketing Board:	
Line of rail	859,335
Eastern Province	76,403
	935,738
To other Buyers in outlying Districts including Barotseland, Northern Province, etc.:	
Estimated	20,000
GRAND TOTAL ...	<u>955,738</u>

TOTAL ANNUAL RECORDED SALES OF MAIZE IN AREAS CONTROLLED UNDER THE GRAIN MARKETING ACT

(Thousands of bags of 200 lb. net)

	<i>African</i>				
<i>Year</i>	<i>European</i>	<i>Line of rail</i>	<i>Eastern Province</i>	<i>Total bought</i>	<i>Total delivered line of rail</i>
1957	1,176	832	83	915	2,073
1958	543	45	11	56	599
1959	1,028	463	53	516	1,531
1960	957	633	85	718	1,675
1961	1,259	859	76	935	2,194

SALES OF GROUNDNUTS, 1961

	<i>Bags of 180 lb. net</i>
Eastern Province	142,734
Other areas (estimated)	7,266
TOTAL ...	<u>150,000 approximately</u>

ANNUAL RECORDED SALES EASTERN PROVINCE GROUNDNUTS

(Bags of 180 lb.)

<i>Harvest Year</i>	<i>Fort Jameson</i>	<i>Petauke</i>	<i>Lundazi</i>	<i>Total</i>
1957	42,795	18,721	3,000	64,516
1958	22,466	12,542	5,641	40,649
1959	34,023	13,348	18,910	66,281
1960	60,511	28,227	17,911	106,649
1961	83,991	45,368	13,375	142,734

AFRICAN BURLEY TOBACCO SALES: EASTERN PROVINCE

<i>Harvest Year</i>	<i>Quantity sold lb.</i>	<i>Average price pence per lb.</i>
1957	12,154	34.87
1958	19,688	18.18
1959	29,647	22.09
1960	64,621	31.70
1961	249,185	24.0

AFRICAN TURKISH TOBACCO SALES

<i>Harvest Year</i>	<i>Quantity Sold—lb.</i>	<i>Average price pence per lb.</i>
1957	17,000	34.2
1958	45,853	31.4
1959	58,381	34.9
1960	217,372	26.62
1961	194,052	22.5

APPENDIX II
CLIMATIC RECORDS, 1960-61

RAINFALL (IN INCHES)

			1960	1961							
			<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>	<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>Total</i>
Mount Makulu	...	...	0.21	3.05	7.44	11.58	7.75	4.92	1.30	0.07	36.32
Lusaka mean	...	...	0.42	3.61	5.91	9.06	7.45	5.61	0.68	0.06	33.80
Monze	...	...	0.23	4.81	6.19	6.48	9.21	5.00	1.29	0.20	33.41
Mean	...	...	0.83	2.88	7.07	8.17	7.62	4.16	0.59	0.05	31.37
Choma	...	...	—	5.27	6.58	7.65	6.37	6.25	1.30	0.22	33.64
Mean	...	...	1.19	3.80	7.11	7.76	8.43	3.66	0.97	0.65	33.57
Ndola	...	...	0.64	3.90	8.81	10.28	13.17	8.85	3.20	1.36	50.21
Mean	...	...	0.78	5.07	10.02	12.28	9.40	7.60	1.43	0.17	46.75
Fort Jameson	...	...	0.16	4.32	9.31	6.10	8.84	14.91	4.39	0.16	48.19
Mean	...	...	0.50	3.52	8.44	9.43	8.91	7.02	1.69	0.17	39.68
Petauke	...	...	0.13	4.03	4.51	11.19	12.57	11.12	1.68	0.06	45.29
Mean	...	...	0.49	3.22	8.63	10.24	8.15	5.99	1.14	0.19	38.07
Lundazi	...	...	—	1.69	4.24	11.92	3.20	8.42	3.32	0.01	32.80
Mean	...	...	0.14	2.61	6.84	9.32	7.77	6.96	1.21	0.16	35.01
Misamfu	...	...	0.12	4.80	6.49	14.03	5.73	11.09	3.95	0.34	46.55
Mean (Kasama)	...	...	0.69	5.33	9.70	10.92	10.03	10.02	2.58	0.34	49.61
Fort Rosebery	...	...	0.12	4.13	7.28	14.92	9.24	12.29	4.20	—	52.18
Mean	...	...	0.86	5.15	8.62	8.99	8.55	7.30	2.25	0.25	41.97
Broken Hill	...	...	—	6.42	4.53	17.14	9.71	6.49	1.12	—	45.41
Mean	...	...	0.64	3.83	9.55	8.81	7.51	4.79	0.78	0.03	35.94
Solwezi	...	...	0.49	10.51	12.40	12.44	8.93	16.03	3.89	0.34	65.03
Mean	...	...	1.88	7.69	12.24	11.97	10.11	9.84	2.40	0.19	56.32
Balovale	...	...	0.18	5.74	8.67	6.71	10.04	7.57	4.86	—	43.77
Mean	...	...	2.09	5.23	8.92	9.50	7.46	6.31	1.45	0.09	41.05
Mongu	...	...	—	3.00	8.44	9.28	7.91	10.58	2.84	—	42.05
Mean	...	...	1.47	3.85	8.71	8.80	7.53	6.12	1.52	0.05	38.05
Mankoya	...	...	—	8.20	5.73	10.38	9.61	4.98	1.46	—	40.36
Mean	...	...	1.53	5.38	7.73	7.53	7.05	5.71	1.03	0.17	36.13

TEMPERATURES (IN °F.)

Mount Makulu:

Mean max.	...	90.03	83.4	83.4	78.2	77.4	78.3	79.5	80.6
Mean min.	...	65.6	65.0	64.9	63.4	62.5	63.3	60.6	56.5

Fort Jameson:

Mean max.	...	89.4	88.1	85.4	81.6	79.9	82.3	82.2	82.4
Mean min.	...	68.3	67.7	67.0	65.9	64.0	64.8	63.8	58.2

Petauke:

Mean max.	...	90.5	88.1	85.3	80.4	80.6	80.4	82.0	82.8
Mean min.	...	67.1	68.3	66.9	65.3	64.4	65.7	64.4	60.2

APPENDIX III

LEGISLATION

The following legislation affecting African Agriculture was enacted during the year 1961:

TERRITORIAL SUBORDINATE LEGISLATION

African Farming Improvement Funds Ordinance

African Farming Improvement Funds (Levy) Order, 1961—Government Notice No. 116.

African Farming Improvement Funds (Levy) (No. 2) Order, 1961—Revocation of Government Notice No. 116 of 1961—Government Notice No. 154.

African Grain Marketing (Deductions) Ordinance

Notice under Section 3—Authorisation of Deductions—Government Notice No. 117.

Notice under Section 3—Authorisation of Deductions—Amendment of Government Notice No. 117 of 1961—Government Notice No. 214.

Brands Ordinance

Brands (Amendment) Regulations, 1961—Government Notice No. 24.

FEDERATION OF RHODESIA AND NYASALAND (CONSTITUTION) ORDER IN COUNCIL 1953

Notices under Item 10 of the Federal Legislative List

Cold Storage Commission (Livestock) Regulations, 1961. (F.G.N. No. 112 of 1961)—Government Notice No. 60.

Cold Storage Commission (Livestock) (Amendment) Regulations, 1961. (No. 1) (F.G.N. No. 150 of 1961)—Government Notice No. 108.

Cold Storage Commission (Prescribed Areas) Notice 1961. (F.G.N. No. 114 of 1961)—Government Notice No. 61.

Pig Industry Amendment Act, 1960 (Federal Act No. 15 of 1960)—Government Notice No. 88.

Specified Commodities and Animals (Amendment) Order, 1961. (No. 1) (F.G.N. No. 242 of 1961)—Government Notice No. 136.

Fencing Ordinance

Amendment of Fourth Schedule to Ordinance—Government Notice No. 40.

Amendment of Fourth Schedule to Ordinance—Government Notice No. 87.

Amendment of Fourth Schedule to Ordinance—Government Notice No. 203.

TERRITORIAL ORDINANCES

Stock Diseases Ordinance (No. 8 of 1961).

Agricultural Credits Ordinance (No. 28 of 1961).

FEDERAL ACTS

Grain Marketing Amendment Act, 1961.

Tobacco Marketing and Levy Amendment Act, 1961.

APPENDIX IV

PUBLICATIONS

The following Bulletins and Reports were published during the year:

A. ANGUS, B.SC.

Note on Plant Diseases in Northern Rhodesia. *Commonwealth Phytopathological News*, April, 1961.

N. R. BROCKINGTON, B.SC., DIP. AGRIC. (CANTAB.)

The Growth, Yield and Protein Content of Twelve Cultivated Grasses in Northern Rhodesia. *The Empire Journal of Experimental Agriculture*, July, 1961.

B. E. MOUNTER, B.SC., DIP. AGRIC. (CANTAB).

Wheat in Northern Rhodesia. *Rhodesia Agricultural Journal*, February, 1961.

J. SMARTT, B.SC., DIP. AGRIC. (CANTAB), D.T.A.

The Diseases on Groundnuts in Northern Rhodesia. *The Empire Journal of Experimental Agriculture*, January, 1961.

C. A. SMITH, M.AGR.SC. (MASSEY).

(Accepted for publication) Seasonal Milk Production using Natural Veld. *Journal of Agricultural Science*.

The Effect on the Growth and Grazing Behaviour of Indigenous Cattle of Restricting their Daily Grazing Time by Night Kraaling. *Journal of Agricultural Science*.

APPENDIX V

PEASANT FARMERS AND IMPROVED FARMERS, 1957-1961

		<i>Northern and Luapula Provinces</i>	<i>Southern Province</i>	<i>Barotse- land</i>	<i>Eastern Province</i>	<i>Central and Western Provinces</i>	<i>North- Western Province</i>	<i>Total</i>
1957 ...	(a)	159	—	9	1,307	165	12	1,652
	(b)	—	1,135	—	—	427	—	1,562
1958 ...	(a)	209	—	2	1,608	197	21	2,037
	(b)	—	1,438	—	—	562	—	2,000
1959 ...	(a)	229	53	—	1,856	213	31	2,382
	(b)	—	2,208	—	—	827	—	3,035
1960 ...	(a)	257	59	—	1,825	250	32	2,423
	(b)	—	2,160	—	—	939	—	3,099
1961 ...	(a)	249	78	—	1,931	276	31	2,565
	(b)	—	1,970	—	—	751	—	2,721

(a)—Peasant Farmers, i.e. in receipt of loans from the Peasant Farming Revolving Fund.

(b)—Improved Farmers, i.e. approved for Improved Farming bonus payments grades "A" and "B" under the Central and Southern Province African Farming Improvement Funds in 1961.

Note.—The figures do not include farmers who failed, nor farmers who were no longer eligible, having already received bonus awards for the maximum period of five years.

APPENDIX VI

NORTHERN RHODESIA

APPROXIMATE VOLUME AND MARKET VALUE OF AFRICAN AGRICULTURAL PRODUCE SOLD: 1961

(Compiled by the Agricultural Economist)

Crop	Barotseland		Central and Western		Eastern		Southern		Northern and Luapula		North-Western		Totals	
	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Gross Value £
Maize (bags of 200 lb.)	9,617	24,000	310,629	466,218	76,403	114,882	548,806	823,584	7,308	10,962	2,975	4,462	955,738	1,444,108
Groundnuts (bags of 180 lb.)	400	1,650	1,305	9,872	142,734	800,000	2,107	9,481	500	1,500	2,954	13,293	150,000	835,796
Sorghums and Millets (bags of 200 lb.)	119	200	19,450	34,000	1,221	1,221	1,680	2,940	159	278	736	1,000	23,365	39,639
Minor Cash Crops (Pulses, Cassava, Sweet Potatoes, Rice, etc.) (Bags of varying weights)	2,012	4,000	9,970	13,700	6,263	8,990	14,959	10,346	1,747	4,367	10,436	12,486	35,387	53,879
Poultry (Estimate)														30,000
Fruit and Vegetables (Estimate)														70,000
Turkish Tobacco (lb.)	2,646	272	28,793	3,642	58,266	4,562	53,563	4,724	41,193	3,780	9,591	1,103	194,052	18,084
Burley Tobacco (lb.)	—	—	264	22	247,662	24,867	—	—	—	—	2,354	186	250,280	25,075
Cattle (Head) (at official sales)...	3,400	47,916	103	1,642	1,866	26,516	3,107	52,417	511	5,299	—	—	8,987	133,790
													TOTAL	£2,650,371

Note.—The above figures are the most complete which are available since they have been taken from the Annual Reports of Provincial Agricultural Officers. Yet it must be stressed that they cannot give a full and accurate picture of sales in the Provinces, since many sales, e.g., by one African to another, or to a local store, etc., cannot be known, nor can the prices at which produce is sometimes sold.

APPENDIX VII—PART I

CO-OPERATIVE SOCIETIES AS AT 31ST DECEMBER, 1961

		Number of Societies	Membership	Shares or Deposits Paid up	On call	Reserves	Turnover	Number of Societies registered during year	Number of Societies dissolved during year
				£	£	£	£		
PRIMARYLY EUROPEAN MEMBERSHIP:									
Credit ...	...	...	184	18,624	—	850	—	—	—
Consumer and Supply ...	...	5	1,065	2,175	—	4,431	145,678	—	1
Producer Marketing ...	...	7	1,747	476,039	12,793	253,763	5,408,320 (a)	—	1
Other ...	...	10	3,374	9,251	—	29,433	11,973	1	1
<i>Total European Societies</i> ...		23	6,370	506,089	12,793	288,477	5,565,971	1	3
PRIMARYLY AFRICAN MEMBERSHIP:									
Thrift/Credit ...	...	40	5,981	138,064	—	728	—	—	4
Consumer and Supply ...	...	12	4,056	2,541	595	4,748	25,401	—	4
Producer Marketing:									
Primary ...	...	142	19,062	24,164	8,635	49,038	808,399 (b)	1	1
Secondary ...	...	10	119	78,272	150	185,905	2,043,263 (c)	—	—
Other ...	...	1	825	1,136	164	87	10,218	—	1
<i>Total African Societies</i> ...		205	30,043	244,177	9,544	240,506	2,887,281	1	10
COMBINED TOTALS		228	36,413	4750,266	£22,337	£528,983	£8,453,252	2	13

(a) £1,145,010 represents consumer goods.

(b) £21,539 represents consumer goods.

(c) £80,367 represents consumer goods.

APPENDIX VII—PART II
CO-OPERATIVE DEVELOPMENT: 1957-61 INCLUSIVE

Year		Societies										Share Capital £	Turnover £
		Number of Societies			Registered during year		Dissolved during year		Membership				
		E.	A.	Total	E.	A.	E.	A.	E.	A.	Total		
1957	...	21	180	201	—	45	1	4	5,299	21,923	27,222	478,279	7,370,022
1958	...	21	206	227	3	28	3	2	3,740	26,263	30,003	475,759	4,566,724
1959	...	23	222	245	3	17	1	1	4,559	28,862	33,421	519,543	6,542,108
1960	...	25	214	239	3	6	1	14	4,758	28,998	33,756	541,199	6,958,023
1961	...	23	205	228	1	1	3	10	6,370	30,043	36,413	750,266	8,453,252

E. = Societies with primarily European membership.

A. = Societies with primarily African membership.

Note.—Comparable figures for the years 1947-1956 are recorded in the Annual Report of the Department of Co-operatives and African Marketing for the year 1960.

APPENDIX VIII

MAIN CROPS MARKETED CO-OPERATIVELY, 1961

				Value
				£
Maize	105,529 short tons			1,761,859
Wheat	497 do.			13,399
Beans	504 do.			17,649
Cow Peas	479 do.			16,047
Sunflower	10 do.			368
Sunn hemp	182 do.			7,188
Kaffir Corn	254 do.			9,635
Rupoko	303 do.			5,193
Bulrush Millet	.08 do.			1
Cassava Flour	10.1 do.			253
Groundnuts (Seed)	7.3 do.			385
Groundnuts (Shelled)	12,803 do.			758,250
Rice (Paddy)	101 do.			5,927
Rice (Hulled)	9.6 do.			544
Potatoes (Seed)	115.3 do.			4,860
Velvet Beans	349 do.			9,151
Peas (Seed)	6.3 do.			205
Pigeon Peas	12.4 do.			217
Soya Beans	4 do.			76
Vegetables	3.4 do.			69
Tobacco, Virginia	4,103,323 lb.			581,304
Tobacco, Turkish	229,000 lb.			28,625
Milk	1,954,348 galls.			872,255
Cheese	1,276,929 lb.			234,601
Butter	1,271,274 lb.			235,470
Butter, imported	977,690 lb.			28,333
Cream	8,018 galls.			16,077
Ice Cream	21,387 galls.			18,068
Other Milk By-products	36,819 galls.			20,259
Eggs	4,075 doz.			815
Dried Fish	34 tons			2,181
Pig by-products	2,913,924 lb.			425,884
Coffee	1,206 lb.			305

APPENDIX IX—PART I

AUDIT AND SUPERVISION FUND

BALANCE SHEET AT 31ST DECEMBER, 1961

<i>Liabilities</i>		£ s. d.		<i>Assets</i>		£ s. d.	
Societies accounts in credit	...	...	...	Amount on deposit with Registrar of Co-operatives Societies	...	14,742	19 9
Balance being excess of revenue over expenditure	...	...	...	Fees due	...	919	17 6
As at 31st December, 1960	...	14,149	8 3				
Add net revenue for year	...	1,491	9 0				
						£15,662	17 3

REVENUE AND EXPENDITURE DURING YEAR ENDED 31ST DECEMBER, 1961

<i>Expenditure</i>		£ s. d.		<i>Revenue</i>		£ s. d.	
Amount due from liquidated society written off	...	...	13 16 9	Fees charged to societies	...	1,617	15 9
Agricultural Shows	...	...	10 0 0				
Costs of inquiries and meetings	...	...	102 10 0				
Balance being excess of revenue over expenditure	...	...	1,491 9 0			£1,617	15 9
			£1,617 15 9				
Balance of Deposit Account—Co-operative Societies in Liquidation	...	...	...			£948	11 4
Balance of Deposit Account—Trade Unions in liquidation now held by Ministry of Labour and Mines	...	...	...			£137	8 1

APPENDIX IX—PART II

GROWTH OF AUDIT AND SUPERVISION FUND

			<i>Balance</i>			<i>Fees charged during year</i>		
			£	s.	d.	£	s.	d.
December 1957	...	...	8,287	7	9	...	...	2,101 0 0
December 1958	...	...	11,639	2	4	...	...	3,548 14 6
December 1959	...	...	11,963	0	4	...	...	2,270 1 7
December 1960	...	...	13,873	14	10	...	...	2,342 1 10
December 1961	...	...	14,742	19	9	...	...	1,617 15 9

APPENDIX X

STAFF AS AT 31ST DECEMBER, 1961

AGRICULTURAL DEPARTMENT

	<i>Post</i>	<i>Authorised</i>	<i>Actual</i>
Director of Agriculture ...	...	1	1
Deputy Director ...	...	1	1
Chief Agricultural Research Officer ...	...	1	1
Chief Agricultural Officers ...	...	5	5
Agricultural Officers ...	...	38	36
Agricultural Officers (Supernumerary) ...	...	1	1
Agricultural Economists ...	...	2	1
Animal Husbandry Officers ...	...	3	1
Tobacco Adviser ...	...	1	1
Conservation Officers ...	...	2	—
Principal Agricultural Supervisors ...	...	10	10
Agricultural Supervisors and Livestock Officers ...	...	58	53
Ecologist ...	...	1	1
Agricultural Chemists ...	...	2	1
Soil Chemist ...	...	1	1
Plant Breeders ...	...	3	1
Plant Pathologist ...	...	1	1
Pasture Research Officers ...	...	2	2
Farm Superintendent ...	...	1	—
Research Assistants ...	...	5	5
Technical Assistants (Scale C.5) ...	...	14	9
African Clerical Staff ...	...	57	57
African Clerical Staff (Intensive Rural Development) ...	...	6	6
Agricultural and Veterinary Assistants (Scales A, B and C) ...	...	408	349
Survey Assistants (Scales A, B and C) ...	...	9	7
Laboratory Assistants (Scales A, B and C) ...	...	9	9
Head, Senior and Agricultural Capitaos (Junior Division) ...	...	240	228
Stockman (Junior Division) ...	...	1	1
Senior Orderlies, Orderlies and Veterinary Orderlies (Junior Division) ...	...	53	39

CO-OPERATIVE DEPARTMENT

	<i>Post</i>	<i>Authorised</i>	<i>Actual</i>
Director of Co-operatives and African Marketing (also Registrar of Co-operative Societies, of Building Societies and of Trade Unions) ...	...	1	1
Principal Co-operative and Marketing Officer ...	...	1	1
Senior Co-operative and Marketing Officer ...	...	1	1
Co-operative and Marketing Officers ...	...	(a)19	(a)16
Clerks (Scale F (Personal)) ...	...	2	2
Clerks (Scales A, B and C) ...	...	15	13
Executive Assistant (Scale 68-B.5 L/C) ...	...	2	2
Technical Assistants ...	...	(b) 2	(b) 2
Co-operative Assistants (Scales A, B and C) ...	...	(b)48	(b)43
Orderlies and Drivers ...	...	(c) 8	(c) 8

(a) Includes staff engaged on Trade Union Duties only: 2.

(b) Includes staff engaged on Trade Union Duties only: 1.

(c) Excludes daily paid staff of Orderlies—2, drivers—8.





NORTHERN RHODESIA

SCALE ~



REFERENCE

- Boundaries: Provincial.....
District.....
Railways.....
Roads: Motor.....
Rivers.....
Swamps.....
- CENTRAL
MPIKE

